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A

MANUAL

OF

USEFUL KNOWLEDGE,

BEING A COLLECTION

OF

VALUABLE MISCELLANEOUS

RECEIPTS

AND

PHILOSOPHICAL EXPERIMENTS,

SELECTED FROM VARIOUS AUTHORS.

By WILLIAM PYBUS.

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P9

TO THE

SOCIETY INSTITUTED IN LONDON

FOR THE ENCOURAGEMENT

OF

ARTS, MANUFACTURES, AND COMMERCE.

My Lords and Gentlemen,

The design of your Association being to promote the practical knowledge and application of scientific principles amongst all classes of the community, I take this opportunity of expressing my admiration of your liberal and patriotic intention, and beg permission to dedicate the following performance, such as it is, to you, as a token of my profound respect; and as a sincere, though feeble effort, in aid of the great purposes of your institution.

I am, my Lords and Gentlemen,
Your most obedient and humble servant,
WILLIAM PYBUS.

M375103

PREFACE.

WHEN an author or editor lays his work before the public, it is not unusual to expect that he should give some account, either of the work itself, or of the motives by which he has been actuated in the publication of it. Of the following compilation the plan sufficiently exhibits and elucidates itself; and the purposes to be answered by it, he trusts will be seen in the usefulness of the information communicated.

As to his motive for making a volume out of materials, widely scattered indeed, but already in the hands of the public, he will frankly acknowledge that he was impelled to this step in part, though not altogether, by the hope of deriving from it some pecuniary advantage.

For some years past it has been the amusement of his few hours of leisure to look into works of a scientific and philosophical description; and out of them, in the course of his reading, to make extracts of what he thought useful or interesting: and he is able to say in regard to most of the receipts and experiments here produced, out of a very large collection, that their correctness has been ascertained and verified by actual trial. This has occasioned to him, as will be easily conceived, no inconsiderable expense; and consequently he has thought it a duty owing to himself, and others dependent on him for *support, to endeavour to turn to some profit what had originally been undertaken and prosecuted for amusement only. He flatters himself, however, that the kindness of those liberal friends by whose subscriptions he has been encouraged to the publication, and the further patronage which he may receive from the public, will be repayed by the value of the facts contained in the volume.*

The Receipts will be found extremely useful to families, and many of them particularly so to seafaring persons.

The Experiments introduced into the latter part of the work are intended principally as subjects of rational and innocent entertainment for young persons; though they are not unworthy of the notice of others also, who may wish to see exemplified the principles of natural philosophy.

The editor cannot conclude without returning his sincere and most grateful acknowledgements to his very numerous and respectable Subscribers; and among them to one Gentleman in particular of this town, and to Dr. Lettsom, of London, for their kind advice and assistance.

WILLIAM PYBUS.

HULL, May 1810.

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A COLLECTION OF *VALUABLE MISCELLANEOUS* RECEIPTS.

1. *An elegant method of obtaining very exact and pleasing Representations of Plants.*

TAKE the plant of which you wish to obtain a representation, and lay it on some sheets of blossom or blotting paper, and having opened out the leaves and flowers, so as to dispose them in the most advantageous manner, lay some of the same kind of paper upon it, and then a large book, or some other convenient weight, in order to press it with a gentle degree of pressure. In this state let it remain two or three days, then remove the upper paper, and see whether the plant be sufficiently firm or stiff to bear removing, when this is the case, smear over every part of the plant with ink, made by dissolving a quantity of Indian ink in warm water, then lay the smeared side on a piece of clean and strong white paper, and covering it with a piece of the blossom or soft paper, press with the hand on every part, and rub it uniformly over, after letting it remain for some time, remove it from the paper, and a distinct and beautiful impression will be obtained, far exceeding in softness of appearance and justness of representation, even the most elaborate and highly finished engraving; it is only to be lamented, that, in this method of figuring plants, some of the minuter characters of the flower must unavoidably be expressed indistinctly, these, however, as well as any other minute parts which may not have been impressed with sufficient sharpness, may be added with a pencil and Indian ink; sometimes a small press is made use of in this process, and various compositions may also be used as well as Indian ink, viz. a kind of fine printers ink, composed of lamp-black, with linseed oil, &c. The figures may occasionally be coloured afterwards in the manner of engravings. Their great merit consists in the happy expression of what botanists term the habit, or true general aspect of the natural plants, a particular in which even the best and most elaborate engravings are found defective.

2. *Method of preparing Skeletons of Leaves.*

THE skeleton or fibrous part of leaves may be prepared by the following easy method, and when neatly executed will afford a highly elegant and pleasing spectacle.

The leaves selected for this purpose should be of their full growth and free from blemishes. Those which are naturally of a less succulent or juicy texture are best calculated for the purpose—as the apricot, apple, cherry, ash, box, and innumerable others. They must be laid in a large pan of water, to be renewed from time to time. In about the space of ten or twelve days, more or less, according to the degree of succulency of the leaves, they will be greatly softened, and the outward skin or coat will be loosened or separated from the green pulp and fibrous part; when the leaves are arrived at this state, take them out, and holding each in a bason of fresh water with a pair of nippers, take hold of any part of the skin on each side, and pull it gently away, till it is entirely detached from both sides of the leaf; then with the thumb and finger gently press the leaf while under water, shaking it slightly from time to time, by which means the green pulpy substance will be readily freed from the fibres, and the skeleton alone will remain, this is to be laid on a piece of blossom or blotting paper till it is dry, and then placed between the leaves of a book, or between fresh papers to flatten. The chief care requisite in the preparation of these vegetable skeletons, consists in keeping the leaves a sufficient length of time in the water, to allow the outward skin to be separated with perfect ease and readiness from the fibrous part. If, upon trial, the skin appears not to separate with sufficient ease, the leaves must continue in water some days longer. It is adviseable not to lay too many leaves in the same pan, lest they should catch or hang upon each other, so as to endanger breaking their edges when taken out for preparing.

By pursuing a similar process several roots, barks and other parts of plants, may be anatomized with equal success.

In order to heighten the beauty of their appearance, they may be dyed either red or green, or of other colours, by dipping them in proper colouring ingredients, and again drying them.

3. *Method of preserving Plants in their original Shape and Colours.*

WASH a sufficient quantity of fine sand, so as perfectly to separate it from all other substances; dry it, pass it through a sieve to clear it from any gross particles which would not rise in the washing, take an earthen vessel of a proper size, and form, for every plant and flower which you intend to preserve; gather your plants and flowers when they are in a state of perfection, and in dryweather, and always with a convenient portion of the stalk: heat a little of the dry sand prepared as above, and lay it in the bottom of the vessel, so as equally to cover it, put the plant or flower upon it, so as that no part of it may touch the sides of the vessel, sift or shake in more of the same sand gradually upon it, so that the leaves may be extended by degrees, and without injury, till the plant or flower is covered about two inches thick, put the vessel into a stove, or hot-house, heated by little and little to the 50th degree of Fahrenheit, let it stand there a day or two, or perhaps more, according to the thickness and succulence of the flower or plant, then gently shake the sand out upon a sheet of paper, and take out the plant, which you will find in all its beauty, the shape as elegant, and the colours as vivid, as when it grew.

Some flowers require certain little operations to preserve the adherence of their petals, particularly the tulip, with respect to which it is necessary, before it is buried in the sand, to cut the triangular fruit which rises in the middle of the flower, for the petals will then remain more firmly attached to the stalk.

4. *To prepare an Hortus Siccus.*

AS botany is a science much studied by ladies, the following ready method of preparing an hortus siccus, or collection of specimens of dried plants, may perhaps be acceptable to a great many of my fair readers.

Take a specimen of a plant or flower, and with it one of its bottom leaves, if it have any, bruise the stalk if too rigid, or slit it if too thick, spread out the leaves and flowers on paper, cover it with more paper, and lay a weight over all; at the end of eighteen hours take out the plants now perfectly flattened, and lay them on a bed of dry common sand, sift more dry sand over them, to the depth of two inches, and let them lay about three weeks, the less succulent dry much sooner, but they take no harm. The cement for fixing them on the paper is thus prepared:—Early in the spring put two ounces of camphor (which prevents the breeding of insects) into three quarts of water, in a large bottle; shake it from time to time, and when the first collected plants are ready for fastening down, put a pint of the camphor water into an earthen vessel that will bear the fire, and add two ounces of common glue and the same quantity of isinglass, beat into shreds; let them stand thirty-six hours, then gently boil the whole a few moments, and strain through a coarse cloth. This is to be warmed when wanted for use, and the back of the plants smeared over with a painter's brush; after this lay them on paper, and press them gently for a few minutes, then expose them to the air a little, and finally lay them under a small weight, betwixt quires of paper, to be perfectly dried.

5. *A method of making the famous Perfume termed by the French Pot Pourri.*

ORANGE flowers and common rose leaves, of each one pound, leaves of red pinks half a pound, leaves of marjoram and myrtle, carefully picked, each half a pound, leaves of musk roses, thyme, lavender, rosemary, sage, camomile, melilot, hyssop, sweet basil, and balm, of each two ounces. Jessamine flowers two or three handfuls, laurel leaves fifteen or twenty, exterior rind of lemons a large handful, small green oranges about the same quantity, salt half a pound, put all into a well leaded earthen jar, and stir the whole carefully with a wooden spatula or spoon, twice a day for a month; afterwards add florentine white iris, and benzoine, of each twelve ounces, cloves and cinnamon powdered of each two ounces, mace, storax, calamus aromaticus and cyprus, of each one ounce. Lemon coloured sandal and long sweet cyprus, of each six drachms, stir all together as before directed, and the issue will be the complete, genuine, delightful perfume termed pot pourri. The proportions specified above must be carefully attended to, as on this much of the perfection of this elegant composition depends, the quantities being so adjusted, that in the combination of all these fine odours, not one is found to predominate beyond another.

6. *Method of preventing the blossom of Fruit Trees from being damaged by early spring Frosts.*

IN the memoirs of the Royal Society of Agriculture, in Paris, for the years 1790 and 1791, an account is given of the following mode of preventing the blossom of fruit trees from being damaged by early spring frosts.

If a hempen rope be intermixed among the branches of a fruit tree in blossom, and the end of it brought down so as to terminate in a bucket of water, should a slight frost take place in the night the blossoms will not be affected by it, but a film of ice, of considerable thickness, will be formed on the surface of the bucket in which the end of the rope is immersed, although another bucket of water, placed beside it for the sake of experiment, will have no ice at all upon it.

7. *How to have the Ground always moist about a Plant.*

IF you are desirous of having the ground always moist about any plant, place near it a vessel of water, putting therein a piece of woollen cloth or list, and let the one end thereof hang out of the vessel to the ground, the other end in the water, in the manner of a crane or syphon. Let the list or cloth be first wet, and by this means will the water continually drop till all be dropped out of the vessel, which may then be renewed. The end that hangs without the vessel, must be always lower than the water within the vessel, else it will not succeed. If it drop not fast enough, increase your list or cloth, if too fast, diminish it.

8. *To fumigate Wall Fruit Trees, in order to destroy Insects, Blights, &c.*

TAKE an old tin watering pan (or any similar vessel) and make a charcoal fire in it, add a tube or pipe, made of either tin, leather, or stiff paper, to the spout which may be of any sufficient length. Then strew some brimstone, tobacco dust, fine shreds of leather, &c. &c. upon the fire in the pot, and cover the top of it.

Having a pair of bellows ready, hold the wind flap over the tube or pipe to receive the smoke, which it will do very effectually when you use the bellows. By this means the suffocating vapour may be directed through the bellows to any part of the tree, with the greatest ease and facility, and the tree soon cleared of all the vermin.

This method is much more effectual than the old one, where a chafing dish has been recommended for this purpose, because this latter method is more troublesome, and requires the wind to blow from a particular quarter right against the trees, which can seldom be obtained.

9. *A method to prevent Hares and Rabbits from destroying the Bark of young Plantations.*

HARES, rabbits and rats, have a natural antipathy to tar; but tar, when exposed to the sun and air for a time, contracts a great dryness and hardness, and if applied to trees in its natural state will occasion them to be bark bound. To remove this difficulty it must be combined with other substances of a loose quality, for it is of so strong a savour that a small quantity mixed with other things, will give to the whole mixture such a degree of its own taste and smell, as will prevent hares or other animals from touching what it is applied to.

Mix the tar with six or seven times the quantity of grease, stirring and mixing them well together, and with this composition brush the stems of young trees as high as hares, &c. can reach.

10. *To make Glass Jars look like China.*

AFTER you have painted your figures cut them out, so that none of the white of the paper remains, then take some thick gum arabic water, pass it over all your figures, and place them on your glass to your own taste; let them stand to dry for twenty-four hours, then clean them well with a wet cloth betwixt the prints, and let them stand a few hours longer, lest the water should move any of the edges, then take white wax and flake white, ground very fine, and melt them together; with a japanning brush go over all your glass above the prints, done in this manner they will hold water: or you may boil isinglass to a strong jelly, and mix it up with white lead ground fine, and lay it on in the same manner: or you may do them with nut oil and flake white. For a blue ground, do it with white wax and Prussian blue, ground fine; for red, wax and vermillion, or carmine; for green, wax and verdigrease; for a chocolate colour, wax and burnt umber.

11. *To make Blue Letters on Sword Blades.*

TAKE the blade, hold it over a charcoal fire till it is blue, then with oil colours write what letters you will upon the blade, and let them dry: when dry take good strong vinegar, make it warm, and pour it all over the blade, this will take off the blue colour: then wet your oil colour with fresh water, and it will come off easily, and the letters drawn therewith remain blue.

12. *Methods of colouring Steel Blue.*

THE steel must be finely polished on its surface, and then exposed to an uniform degree of heat. The colouring is effected three ways—first, by a flame producing no soot, as spirits of wine;—

secondly, by a hot plate of iron; and thirdly, by wood ashes. As a very regular degree of heat is necessary, wood ashes for fine work bear the preference. The work must be covered over with them, and carefully watched: when the colour is sufficiently exalted the work is perfect.

This colour is occasionally taken off with a very dilute marine acid.

13. *Way of tempering equally a number of small Steel Instruments at once.*

A plate of iron floats upon melted lead, and receives therefrom, in all its parts, an equal heat; the pieces of steel laid upon this plate acquire all at once the same degree of heat, and are at once quenched in water, the blue or other colours which they assume, affording sure marks of the proper points of heat at which they are to be quenched, according to the different degrees of hardness required in them.

14. *A simple Experiment to prevent the dreadful effects of sleeping in a damp Bed.*

LET your bed be first well warmed, and immediately after the warming-pan is taken out, introduce between the sheets, in an inverted position, a clean glass goblet: after it has remained in that situation a few minutes, examine it; if found dry and not tarnished with steam, the bed is perfectly safe, but if drops of wet or damp adhere to the inside of the glass, it is a certain sign the bed is damp.

15. *A method made use of in Sweden for preserving from Rust, any sort of Iron Work that is exposed to the air.*

THEY take such a quantity of pitch and tar as they think they may then have occasion for, and mix up with it such a quantity of the best sort of soot as not to make it too thick for use. With this composition they paint or besmear all the parts of the iron work; for which purpose they make use of short, hard brushes, because they must press pretty strongly upon the iron, in order to give it a sufficient quantity, and they always chuse to perform this operation in the spring time of the year, because the moderate heat of that season hardens the pitch so much, that it is never melted by the succeeding heats of the summer, but on the contrary acquires such a gloss as to look like varnish. This is found by experience to preserve iron from rust much better than any sort of paint; and is as cheap as any that can be made use of.

16. *A method of making excellent Starch, of Potatoes.*

TAKE potatoes, wash them well in clean water, so that not the least earth or dirt may be left upon them, pare them lightly, or scrape them so as not to let the least skin remain. Then take several earthen pans, half filled with pure water, and a tin grater as fine as those used for grating sugar. Rest your grater upon the bottom of the earthen pan in the water, and thereon grate your potatoes as you do citrons and quinces, moistening them from time to time, and taking care not to press the potatoes too hard upon the grater. The grated potatoe will sink to the bottom, when your pans are all filled let them stand till they be well settled, then pour off the water by inclining them very gently, lest the finest part of the grated substance should run off along with the water. The grated potatoe may then be put into fewer pans, each being filled within four or five fingers' breadth of the top, and then filled up with pure water. Let the matter be well stirred about and washed, and when it has stood to settle, let the pan be inclined, and the water poured off as before. These lotions, with fresh, clear water, must be several times repeated, till at length you will see the grated potatoe become as white as snow, and incomparably fine and small, and not run into little lumps and masses, like the common starch. These are the signs of its being sufficiently washed and ready to set out to dry in the sun.

17. *Method of extracting Starch from Horse Chesnuts.*

IN the year 1796, a patent was taken out by Lord William Murray, for a method of extracting starch from horse chesnuts, and the following is the process as described by the patentee.

I first take the horse chesnuts out of the outward green prickly husks, and then either by hand, with a knife or other tool, or also with a mill adapted for that purpose, I very carefully pare off the brown rind, being particular not to leave the smallest speck, and to entirely eradicate the sprout or growth. I next take the nuts, and rasp, grate, or grind them fine into water, either by hand or by a mill adapted for that purpose. The pulp which is thereby formed in this water, I wash as clean as possible, through a coarse horse-hair sieve; this I again wash through a finer sieve, and then again through a still finer, constantly adding clean water to prevent any starch adhering to the pulp. The last process is to put it with a large quantity of water, (about four gallons to a pound of starch) through a fine gauze muslin or lawn, so as entirely to clear it of all bran or other impurities: as soon as it settles pour off the water, then mix it up with clean water, repeating the operation till it no longer imparts any green, yellow, or other colour to the water. Then drain it off till nearly dry, and set it to bake, either in the usual mode of baking starch, or else spread it out before a brisk fire, being very attentive to stir it frequently, to prevent its horning, that is to say, turning to a paste or jelly, which on being dried turns hard, like horn. The whole process should be conducted as quickly as possible.

18. *To keep and preserve Eggs sound for the space of two years.*

THE following easy and simple process, for keeping and preserving perfectly sound, the eggs of hens, turkies, geese, and ducks, was invented by Mr. William Jayne, an ingenious confectioner, at Sheffield, in Yorkshire, to whom a patent was granted February 8th, 1791.

Take and put into a tub or vessel one bushel, Winchester measure, of quick lime, thirty-two ounces of salt, eight ounces of cream of tartar, and mix the same together with as much water as will reduce the composition, or mixture, to that consistence, that it will cause an egg put into it to swim with its top just above the liquid; then put, and keep the eggs therein, which will preserve them perfectly sound for the space of two years at the least.

This method is not the worse for being simple, and the still simpler one of merely keeping eggs in salt, is known by many good housewives to preserve eggs quite sound for a considerable time.

When we consider the high price of eggs every winter, this invention must appear of very great consequence, and I trust that my fair readers will thank me, for presenting them with the exact method described in the specification of the patent granted to Mr. Jayne.

19. *To prevent Lamps from proving pernicious to Asthmatic Persons, or others, liable to Complaints of the Chest.*

SMOKING of lamps is a circumstance frequently disregarded in domestic life, as however the fumes ascending from the oil, especially if it be tainted or rancid, are highly pernicious, when inhaled into the lungs of asthmatic persons, or others, liable to complaints of the chest, I shall communicate the following simple expedient. Let a sponge, three or four inches in diameter, be moistened with pure water, and in that state be suspended by a string or wire, exactly over the flame of the lamp, at the distance of a few inches, this substance will absorb all the smoke emitted during the evening, or night, after which it should be rinsed in warm water, by which means it will be again rendered fit for use.

20. *To make economical Wicks for Lamps.*

WHEN using a lamp with a flat wick, if you take a piece of clean cotton stocking, it will answer the purpose as well as the cotton wicks which are sold in the shops.

21. *Cheap method of Dyeing Cotton a fine, permanent, Nankeen Yellow.*

Mr. CHAPTAL, whose ingenious labours have contributed exceedingly to elucidate the theory of dyeing, has proposed a very simple and cheap method of dyeing cotton a fine, permanent, nankeen yellow. His process is as follows:

Cotton has so strong an affinity for oxyd of iron, that if put into a solution of that oxyd, in any acid whatever, it decomposes the salt, absorbs the iron, and acquires a yellow colour. The cotton to be dyed is to be put into a cold solution of sulphat of iron of the sp. gr. 1,020, it is then wrung out and put directly into a ley of potass of the sp. gr. 1,010, into which a solution of alum has been poured till it was saturated with it; after the cotton has remained in this bath four or five hours, it may be taken out, washed and dried. By this process cotton may be dyed all the different shades of nankeen, by varying the proportion of the sulphat of iron. This colour has the advantage of not being injured by washing, and of being exceedingly cheap.

22. *To make a saponaceous Ley, which, in washing, shall answer almost all the purposes of good hard Soap.*

TAKE any quantity of well burnt ashes, of hard, heavy wood, mix with these a few handfuls of lime, newly slaked, add water, and boil the whole into a lixivium. Then leave the lixivium at rest, till those extraneous matters which cannot enter into it, shall have been deposited at the bottom, or thrown to the surface to be skimmed off. Then draw off the pure lixivium, add to it oil, to about a thirtieth or fortieth part of its own quantity. The mixture will be a liquor white as milk, capable of frothing like soap water, and in dilution with water, perfectly fit to communicate sufficient whiteness to linen. This liquor may be prepared from wood ashes of all sorts, and from rancid grease, oil, or butter. It is, therefore, highly worthy of the attention of the economical. When the ashes are suspected to be unusually deficient in alkali, a small addition of pulverized pot ash or soda, may be made to the lixivium.

23. *Simple method of preserving the Air pure in large Halls, Theatres, Hospitals, &c.*

Dr. VAN MARUM has discovered a very simple method, proved by repeated experiments, of preserving the air pure in large halls, theatres, hospitals, &c. The apparatus for this purpose is nothing but a common lamp, made according to Argand's construction, suspended from the roof of the hall, and kept burning under a funnel, the tube of which rises above the roof without, and is furnished with a ventilator. For his first experiment he filled his large laboratory with the smoke of oak shavings. In a few minutes after he lighted his lamp the whole smoke disappeared, and the air was perfectly purified.

24. *To restore the Blackness of old Leather Chairs, &c.*

MANY families, especially in the country, possess chairs, settees, &c. covered with black leather. These, impaired by long use, may be restored nearly to their original good colour and gloss, by the following easy and approved process.

For every two yokes of new-laid eggs, retain the white of one; let these be well beaten up, and then shaken in a glass vessel or jug, to become like a thick oil; dissolve in about a table spoonful or less of geneva, an ordinary tea lump of loaf sugar, make this thick with ivory black, well worked up with a bit of stick; mix with the eggs for use. Let this be laid on as blacking ordinarily is for shoes: after a very few minutes polish, with a soft, new, or very clean brush, till completely dry and shining, let it remain a day to harden.

The same process answers admirably for ladies' cordovan or gentlemens' dress shoes, but with the following addition for especially protecting the stockings from soil.

Let the white or glair of eggs be shaken in a large glass phial, until it becomes a perfect oil; brush over the inner edges of the shoes with this, and when completely dry it will prevent all soiling from the leather. This requires to be repeated.

25. *A method of preserving Cream in a sweet state for several weeks, and even months.*

TAKE twelve ounces of white sugar, and dissolve them in the smallest possible quantity of water, over a moderate fire. After the solution has taken place, the sugar ought to be boiled for about two minutes in an earthen vessel, when twelve ounces of new cream should be immediately added, and the whole thoroughly mixed while hot. Let it then gradually cool, and pour it into a bottle, which must be carefully corked. If kept in a cool place, and not exposed to the air, it may be preserved in a sweet state for several weeks, and even months; and as sugar is commonly wanted when there is occasion for cream, the cream is thus preserved without any sort of additional expence.

26. *To make Blunt's new invented Composition, to be used instead of Yeast.*

TO make a yeast gallon of the above composition, to be used as yeast, such yeast gallon containing, and to contain eight beer quarts; boil in common water eight pounds of potatoes, as for eating; bruise them perfectly smooth, and mix with them, whilst warm, two ounces of honey, or any other sweet, and one quart (being the eighth part of a gallon of yeast) of common yeast; and for making bread mix three beer pints of the above composition with a bushel of flour, using warm water in making the bread—the water to be warmer in winter than in summer, and the composition to be used in a few hours after it is made, and as soon as the sponge (the mixture of the composition with the flour) begins to fall the first time, the bread should be made, and put into the oven.

27. *The Persian method of making Yeast.*

THIS useful article, of which there is frequently a scarcity in this country, is thus prepared on the coast of Persia.

Take a small tea cup or wine-glass full of split or bruised pease, pour on them a pint of boiling water, and set the whole in a vessel all night on the hearth, or any other warm place: the water will have a froth on its top the next morning, which will be good yeast. An English gentleman when in Persia, had his bread made with this yeast, and in the English manner, of good wheat flour. In our cold climate, especially in a cold season, it should stand longer to ferment, perhaps 24 or 48 hours. Of all the methods of making yeast hitherto known this is by far the most ready and simple.

28. *An excellent method to preserve a constant Stock of Yeast.*

WHEN you can spare yeast take a quantity, stir and work it well with a whisk, till it seems liquid and thin. Then get a large wooden dish or tub, clean and dry, and with a soft brush lay on a thin layer of the yeast thereon, turning the mouth downwards, to prevent its getting dust, but so that the air may come to it to dry it. When that coat or crust is sufficiently dried, lay on another, which serve in the same manner, and continue putting on others as they dry, till two or three inches thick, which will be useful on many occasions. But be sure the yeast in the vessel be dry before more be laid on. When wanted for use, cut a piece out, lay it in warm water, stir it together, and it will be fit for use. If for brewing take a handful of birch tied together, dip it into the yeast, and hang it to dry, taking care to keep it free from dust. When your beer is fit to set to work, throw in one of these, and it will work as well as if you had fresh yeast. You must whip it about in the wort and then let it lie. When the beer works well take out the broom, dry it again, and it will do for the next brewing.

29. *Method of Ripening any quantity of Wort, and of effectually raising a Bushel of Flour with a Tea spoonful of Barm—i. e. Yeast.*

WHEN you have boiled and strained off the hops from your first copper of wort, then take two or three quarts, put it into a vessel in which it may lie shallow, in order to cool quick, and in about an hour's time you find it just warm, you then take a tea spoonful of barm, put it into it, and in two or three hours you will find it come to a head; by this time you may have got some more cold, and then take the two or three quarts and put them into four or five gallons, and they will bring it to a head (or as it is called, to be ripe) in two or three hours more then add these to a hogshead, and all will soon be ripe, by virtue of that tea spoonful only.

As to baking, suppose you want to bake a bushel of flour, and have but one tea spoonful of barm, you then put your flour into your kneading trough, or trendle, and then take about three quarters of a pint of warm water, and take the tea spoonful of thick, steady barm, and put it into the water, stir it until it is thoroughly mixed with the water, then make a hole in the middle of the flour large enough to contain two gallons of water; pour in your small quantity, then take a stick about two feet long (which you may keep for that purpose) and stir in some of the flour until it is as thick as you would make batter for a pudding; then strew some of the dry flour over it, and leave it for about one hour: then take about a quart of warm water more, and pour it in, for in one hour you will find that small quantity raised so, that it will break through the dry flour which you shook over it. When you have poured in the quart of warm water, take your stick as before and stir in some more flour, until it is as thick as before; then shake some more dry flour over it, and leave it for two hours more, and then you will find it rise, and break through the dry flour again: then you may add three quarts, or a gallon, of water more, and stir in the flour, and make it as thick as at first, and cover it with dry flour again; and in three or four hours more you may mix up your dough, and then cover it up warm, and in four or five hours afterwards you may put it into the oven, and you will have as light bread as though you put a pint of barm in. It does not take above a quarter of an hour more time than the usual way of baking, for there is no time lost but that of adding water three or four times.

The author of this method affirms, that he constantly bakes this way in the morning: about six or seven o'clock puts the flour out, and puts this small quantity of barm into the before-mentioned quantity of water; in an hour's time some more; in two hours more a greater quantity; about noon makes up the dough, and about six in the evening it is put into the oven, and he has always good bread, never heavy or bitter.

When you find, he says, your body of flour spunged large enough, before you put in the rest of your water, you should, with both your hands, mix that which is spunged and the dry flour all together, and then add the remainder of warm water, and your dough will rise the better and the easier.

The reason he assigns why people make heavy bread is not because they have not barm enough, but because they do not know that barm is the same to flour as fire is to fuel; that as a spark of fire will kindle a large body by only blowing of it up, so will a thimble full of barm, by adding warm water, raise or spunge any body of flour: for warm water gives fresh life to that which is before at work, so that the reason of making bread heavy is because the body spunged is not large enough, but was made up and put into the oven before it was ripe.

In regard to the difference of seasons he prescribes, that in the summer the water be put in blood warm, and in winter, in cold, frosty weather, as warm as the hand can bear it, without smarting; and that in winter the dough be covered up very warm.

The covering of it with dry flour every time the warm water is added, will keep in the heat when you have added six or eight quarts of warm water, as before-mentioned, in such a gradual way, you will find all that body of flour which is mixed with the warm water, by virtue of that one tea spoonful of barm, brought into great agitation.

30. *To Tin Copper Sauce Pans, &c.*

AS many families, living at a distance from towns, have no opportunity of sending their copper utensils to be re-tinned, or carelessly overlook such necessary repair, I think it useful to observe, that the whole process may be easily performed by servants who possess common skill and dexterity. For this purpose the vessel ought to be previously scoured and dried, then exposed to a moderate heat, with such a portion of pure grain tin as may be sufficient to cover the inner surface: when this metal is melted, a small quantity of sal ammoniac should be strewed over it, and immediately after a whisk or roll of coarse and hard twisted flax, must be employed, for spreading the composition uniformly over the sides and bottom of the vessel. To improve the coating, about a third part of zinc may be added to the tin, though the latter would produce the desired effect, if it could be obtained in a pure state.

31. *Method of Tinning Copper which will last ten times longer than the method now used.*

THE copper must be wrought in the common way till it is ready for the first pickling, then pickle it off in the common way, after which it must be freezed in the inside, upon stakes, cut as rough as a coarse file, or any other method of freezing which opens the pores of the copper, and makes the tinning penetrate. That being done, the copper must be pickled for the last time, and scoured clean on both sides. Then tin it with sal ammoniac and grain tin, and when properly tinned with that, take a metal compounded of grain tin and zinc or spelter, in the following proportions, viz. to each pound of grain tin add one pound and a half of zinc or spelter, or any other metal of equal wholesomeness and hardness; with this metal and sal ammoniac tin it well over, and when so tinned, scour the outside clean, and rough planish it on a bright stake. Then rub the inside with chalk and water, so that the tin comes clean, planish and smooth it hard, so as to bring it to a gloss. All pieces of work, that require to be tinned on both sides, such as ladles, skimmers, &c. must be freezed on a cut stake, with a cut hammer, or in such manner as before-mentioned, and dipped in the melted metal, and finished as before. All nails must be freezed, and dipped likewise in the metal.

32. *To make a Vessel for Filtering Water.*

WHERE water is to be filtered in large quantities, as for the purposes of a family, a particular kind of soft, spongy stones, called filtering stones, are employed. These, however, though the water percolates through them very fine, and in sufficient quantity at first, are liable to be obstructed in the same manner as paper, and are then rendered useless. A better method seems to be, to have a wooden vessel lined with lead, three or four feet wide at top, but tapering so as to end in a small orifice at the bottom. The under part of the vessel is to be filled with very rough sand, or gravel, well freed from earth by washing; over this pretty fine sand may be laid, to the depth of twelve or fourteen inches, but which must likewise be well freed from earthy particles.

The vessel may then be filled up to the top with water, pouring it gently at first, lest the sand should be too much displaced. It will soon filtre through the sand, and run out at the lower orifice exceedingly transparent, and likewise in very considerable quantities. When the upper part of the sand begins to be stopped up, so as not to allow a free passage to the water, it may occasionally be taken off, and the earthy matter washed from it, when it will be equally serviceable as before.

33. *The Turkish method of Filtering Water by Ascension.*

THEY make two wells, from five to ten feet, or any depth, at a small distance, which have a communication at the bottom. The separation must be of clay well beaten, or of other substances impervious to water. The two wells are then filled with sand and gravel. The opening of that into which the water to be filtered is to run, must be somewhat higher than that into which the water is to ascend; and this must not have sand quite up to its brim, that there may be room for the filtered water; or it may, by a spout, run into a vessel placed for that purpose. The greater the difference is between the height of the two wells, the faster the water will filter, but the less it is the better, provided a sufficient quantity of water be supplied by it.

This may be practised in a cask, tub, jar or other vessel. The water may be conveyed to the bottom by a pipe, the lower end having a sponge in it, or the pipe may be filled with coarse sand.

It is evident that all such particles, which by their gravity are carried down in filtration by descent, will not rise with the water in filtration by ascension. This might be practised on board ships at little expence.

34. *To make a Vegetative Liquor to hasten the blowing of Bulbous Rooted Flowers.*

TAKE nitre three ounces, common salt one ounce, pot ash half an ounce, sugar half an ounce, rain water one pound. Dissolve the salts in a gentle heat, in a glazed earthen pot, and when the solution is complete, add the sugar, and filter the whole. Put about eight drops of this liquor into a glass jar, filled with rain or river water. The jars must be kept always full, and the water removed every ten or twelve days, adding each time a like quantity of the liquor: the flowers also must be placed on the corner of a chimney-piece, where a fire is regularly kept. The same mixture may be employed for watering flowers in pots, or filling the dishes in which they are placed, in order to keep the earth, or the bulbs or plants which they contain, in a state of moisture.

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35. *To prevent the melancholy Accidents that frequently happen from the common practice of leaving a Poker in the Fire.*

THE following invention, for this purpose, is equally simple and secure. Immediately above that square part of the poker, by blacksmith's called the bit, let a small cross of iron, about an inch and a half each way be welded in.

The good consequences of this simple contrivance will be—1st. If the poker, by the fire giving way, should slip out, it will probably catch on the edge of the fender.

2nd. If it should not, it cannot injure the hearth or carpet, as the hot part of the poker will be borne up some inches.

And 3d. The poker cannot be run into the fire further than the bit, which, in regard to a polished poker, is also of some consequence.

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36. *Description of a method of Sweeping narrow Chimneys, without employing Children.*

PROCURE a rope for the purpose, twice the length of the height of the chimney, to the middle of it tie a bush, (broom, furze, or any other [illegible] sufficient size to fill the chimney, put one end of the rope down the chimney, (if there be any windings in it, tie a bullet, or round stone, to the end of the rope) and introduce the wood end of the bush. After the rope has descended into the chamber, there let a person pull it down. The bush, by the elasticity of its twigs, brushes the sides of the chimney as it descends, and carries the soot with it. If necessary, the person at the top, who has hold of the other end of the rope, draws the bush up again; but in this case, the person below must turn the bush to send the wood end foremost, before he call to the person at top to pull it up.

37. *To make Balls to cause a Fire to kindle immediately.*

KINDLING balls, composed of equal parts of coal, charcoal and clay, the two former reduced to a fine powder, well mixed and kneaded together, with the clay moistened with water, and then formed into balls of the size of hen's eggs, and thoroughly dried, might be used with great advantage, instead of wood for kindling fires. These kindling balls may be made so inflammable as to take fire in an instant, and with the smallest spark, by dipping them in a strong solution of nitre, and then drying them again; and they would neither be expensive, nor liable to be spoiled by long keeping. Perhaps a quantity of pure charcoal, reduced to a very fine powder, and mixed with the solution of nitre, in which they are dipped, would render them still more inflammable.

38. *Preparation of Coal Balls or Bricks, for Fuel, by which a large quantity of Coals may be saved.*

IT has long been customary, in the province of Hainault, and throughout the whole of Flanders, to convert, by a very simple process, the small dust of pit coal, which is generally thrown away, into a very valuable article of fuel, by moulding it up with clay into bricks or balls of the size of a twelve pound cannon ball. For this purpose the small coal is sifted, and the larger fragments are reduced into a coarse powder, in a mortar, which is then mixed with the general mass. A tub is then filled about one-third, with any common, tenacious clay, and a quantity of water poured upon it; when the whole is well mixed, and is of the consistence of thick cream, a hole is made in the heap of coal slack, and the clay poured in; the coal and clay are then stirred together with a rake, or any other convenient instrument, till the parts are perfectly incorporated. Of this mass bricks may be made in the usual manner, or it may be formed into balls by the hand; these, after being dried under cover for a fortnight or three weeks, according to the weather: may be either used immediately as fuel, or stacked for future consumption. By this preparation not only the coal refuse is turned to advantage, but the quantity of heat produced, and the length of its duration, is so much increased, that a bushel of these balls will make a hotter fire, and last longer, than the same measure of common coal, in the proportion of eight to five.

The above method has been long practised in this country, in Northamptonshire, Oxfordshire, and probably several other counties, where coals are scarce.

It is on every account desirable that the greater part of the small coal should be disposed of in this way, and the mills at present in use, for grinding brick clay, will serve admirably well to mix the materials. In using these balls the most convenient way is, first, to make a fire of common coal, so as to half fill the grate, and then to pile the balls a little above the top bar: a common grate thus charged, will require no stirring, and will need no fresh fuel for ten hours.

39. *Method of saving Lives at dangerous Fires.*

INTO the upper part of a window-frame drive a staple, or screw, in an iron bolt, with an eye. Provide two blocks, with two or three pullies in each, (which may be had at any ship block-makers) pass a rope through each pulley, of a length sufficient to reach the ground from the top of the window. Provide also a strong bag, or sack, of about four feet deep, and eighteen inches wide, with a wooden bottom, and a few hoops to keep the sack open. When an unhappy occasion requires the use of these, let the hook of the upper block be hung in the staple; then the party must stand in the wooden bottom, and draw the sack up about them, and hang the string of the sack on the hook of the under block, when any one person may, with the greatest ease and safety, let them down to the street, and drawing up the sack again, may, in like manner, let down a whole family—women, children, sick, old and infirm; and at last lower himself down by only holding the same rope in his own hand.

40. *Hints for the conduct of Females, whose Cloaths have by accident taken Fire.*

EXTRAORDINARY instances sometimes occur of persons whose clothes have by accident taken fire, escaping, by adopting the use of means suggested at the moment by extraordinary presence of mind. But rather than trust to what presents itself during impressions of extreme terror, to a mind totally unfurnished with any fixed mode of proceeding, it will perhaps be better to lay down certain rules, which being strongly imprinted on the mind, will serve to direct to the most safe and beneficial line of conduct.

To call for help presents itself to the mind so instinctively, that it would not be mentioned here, but to remark, that this should be done, if possible, by ringing the bell, &c. without opening the door of the apartment, as the external air rushing in would immediately increase the rapidity of the progress of the flames.

The first attempt should be to tear off that part of the cloathing which is in flames, and, if in a parlour, to seize the water decanter, and which, even for this reason alone, should be large, and kept always full, or any other vessel of water, which may be in the room where the accident has happened, should be recollected and flown to.

If unsuccessful in these instantaneous exertions for relief, the unfortunate sufferer should seat herself on the floor, remembering that in this posture, she will be better enabled to smother the flames of her lower garments, and that an upright posture will render the communication of the flames to the upper part of her dress more probable.

In this situation should there be a hearth carpet, or rug, (which even for this use, in this moment of emergency, should form part of the furniture in every room) it will, from the materials of which it is composed, prove highly useful in extinguishing the flames, laid over the burning clothes, or wrapped tight round them.

Females are most commonly the subjects of this terrible accident, owing to their clothing being of a more combustible kind than that of men; woollen clothes not only burning much slower than linen or cotton, but giving an alarm much sooner, by the smell their burning occasions. Females, therefore, whose age or infirmities confine them much to their fire sides, and prevent the hope of any active exersions, should be persuaded to wear gowns and aprons of silk, or of stuffs of some fabric in which worsted and silk are blended, instead of muslin and fine linen, which not only will catch fire almost with a spark, but will burn with the utmost rapidity.

41. *To prevent the Inflammability of Muslin Dresses.*

THE inflammability of muslin dresses may be prevented by rincing them out with alum water, made by dissolving the proportion of a hen's egg, or even less, in a quart of water.

That by this simple means all danger of life will be prevented; any one may judge by burning a rag of muslin so rinced and dried, against another rag unprepared; the first will burn gradually and with difficulty, whilst the second will flame away.

42. *An easy and expeditious method of Extinguishing Fire in Chimneys.*

IMMEDIATELY lay upon the fire in the grate or range a large forkfull of wet horse litter, from the stable or dunghill. If it be properly managed the steam ascending from the litter will extinguish the flame in the chimney, perhaps in less than a minute, only care must be taken that the litter be not so moist as to put out the fire in the grate or hearth, and likewise that it be not too dry, for in that case it would break out into a flame, and increase instead of lessening the evil. It is likewise necessary to continue to make the steam to ascend until the fire in the chimney is entirely extinguished.

This method has not only been found successful when used in the narrow chimneys of towns, &c. but also in the wide, spacious chimneys, that are frequently met with in the kitchens of country farmers; and it is likewise obvious, that any materials may be used on this alarming accident, to produce a sufficient body of steam to fill the chimney, provided that the materials have such a quantity of moisture, as to prevent them bursting out into a flame.

43. *To make a Powder that will prevent Wood, Paper, Linen, Cotton, &c. from catching Fire.*

TAKE one ounce of sulphur, one ounce of red ochre, and six ounces of copperas, mix them together and pulverize them. To prevent wood catching fire, it is first covered with joiner's glue, over which the powder is spread. This process is repeated three or four times after the wood has become dry. In paper, linen, cotton, &c. only water is used instead of glue, and the process is repeated twice.

44. *Method of Cleansing Silk, Woollen, and Cotton Goods, &c. without damage to the Texture or Colour.*

GRATE clean washed raw potatoes to a fine pulp, in clean water, and pass the liquid matter through a coarse sieve into another vessel of water; let the mixture stand till the fine white particles of the potatoes are precipitated, then pour the mucilaginous liquor from the fecula, and preserve the liquor for use. The article to be cleaned should then be laid upon a linen cloth on a table, and having provided a clean sponge, dip the sponge in the potatoe liquor, and apply it to the article to be cleaned, till the dirt is perfectly separated; then wash it in clean water several times, to remove the loose dirt, it may afterwards be smoothed or dried. Two middle sized potatoes will be sufficient for a pint of water.

The white fecula will answer the purpose of tapioca, and make an useful, nourishing food, with soup or milk, or serve to make starch and hair-powder. The coarse pulp which does not pass the sieve, is of great use in cleaning worsted curtains, tapestry, carpets, or other coarse goods.

The mucilaginous liquor will clean all sorts of silk, cotton, or woollen goods, without hurting or spoiling the colour: it is also useful in cleaning oil paintings, or furniture that is soiled. Dirty painted wainscots may be cleansed by wetting a sponge in the liquor, then dipping it in a little fine clean sand, and afterwards rubbing the wainscot with it.

45. *Process for Cleaning Feathers from their Animal Oil.*

TAKE for every gallon of clear water, one pound of quick lime, mix them well together, and when the undissolved lime is precipitated in fine powder, pour off the clear lime water for use; at the time it is wanted put the feathers in another tub, and add to them a quantity of the clear lime water, sufficient to cover the feathers about three inches, when well immersed and stirred about therein. The feathers when thoroughly moistened, will sink down, and should remain in the lime-water three or four days, after which the foul liquor should be separated from the feathers by laying them on a sieve.

The feathers should be afterwards well washed in clean water and dried upon nets, about the same fineness as the cabbage nets. The feathers must from time to time, be shaken on the nets, and as they dry they will fall through the meshes, and must then be collected for use.

The admission of air will be serviceable in the drying, and the whole process may be compleated in about three weeks. The feathers when thus prepared will want nothing more than beating for use, either as beds, bolsters, pillows or cushions. This is an important discovery, particularly as the feathers, by not being hardened with heat, require less beating.

46. *To make an excellent Cement for curing Damp Walls.*

BOIL two quarts of tar with two ounces of kitchen grease, for a quarter of an hour, in an iron pot; add some of this tar to a mixture of slaked lime and powdered glass, which have passed through a flour sieve, and been completely dried over the fire in an iron pot, in the proportion of two parts of lime and one of glass, till the mixture becomes of the consistence of thin plaster. The cement must be used immediately after being mixed, and therefore it is proper not to mix more of it than will coat one square foot of wall, since it quickly becomes too hard for use, and care must be taken to prevent any moisture from mixing with the cement. For a wall merely damp, a coating one eighth of an inch thick will be sufficient; but if the wall is wet, there must be a second coat. Plaster made of lime, hair, and plaster of Paris, may afterwards be laid on as a cement.

The cement above described will unite the parts of Portland stone or marble, so as to make them as durable as they were prior to the fracture.

47. *Method of Whitening the grey Marine Salt, to fit it for domestic purposes without the aid of Heat.*

TAKE four ounces of grey salt, and, if dry, besprinkle it gently with water till it be only what is called moist; but it will be very seldom necessary to have recourse to this operation. Put the salt into the corner of a table napkin or piece of linen cloth, and form the cloth into a kind of knot or bag, which you must hold in one hand, while with the other you rub and shake the salt against the inside of the cloth for the space of half an hour. Then shift the salt to another place of the cloth, successively repeating the same manœuvre six, seven, or eight times, according as the salt is more or less grey.

After the salt has been rolled for the first time, the cloth begins to exhibit spots, occasioned by the earth which the salt deposits, and of which the intensity sensibly decreases at each change of place, till they entirely disappear. In general, the salt must be besprinkled every two or three times that its place is changed. The bleaching will be accelerated by pounding the salt slightly before it is besprinkled.

After two or three aspersions and rubbings, the salt is in general as pure and white as that refined, according to the usual method, by solution and evaporation.

The loss, in both cases, is nearly the same: that is to say, about an eighth, when the salt is dry, and when care has been taken, at each change of place, to shake off the grains which adhere to the cloth. It is, for the most part, the whitest salt that adheres in this manner, and it may be shaken off without fear, as the earth deposited on the cloth cannot detach itself till the cloth is dry. The grey salt of commerce contains, in general, 12½ per cent. of foreign matters, nearly one half of which is water, and about as much earth.

This process, on account of its simplicity, is very useful for domestic purposes.

48. *The German method of preparing a cheap substitute for Oil Paint.*

IT often happens that people do not choose, or cannot employ oil painting in the country, either because it does not dry soon enough, and has an insupportable smell, or because it is too dear. M.

Ladicke employed, with the greatest success, the following method for painting ceilings, gates, doors, and even furniture.

THE PROCESS.

Take fresh curds, and bruise the lumps on a grinding stone, or in an earthen pan or mortar, with a spatula. After this operation put them into a pot, with an equal quantity of lime well quenched, and become thick enough to be kneaded; stir the mixture well without adding water, and you will soon obtain a white coloured fluid, which may be applied with as much facility as varnish, and which dries very speedily. But it must be employed the same day, as it will become too thick the day following.

Ochre, Armenian bole, and all colours which hold with lime, may be mixed with it according to the colour which you wish to give to the wood, but care must be taken that the addition of colour made to the first mixture of curds and lime, may contain very little water, else the painting will be less durable.

When two coats of this paint have been laid on, it may be polished with a piece of woollen cloth, or other proper substance, and it will become as bright as varnish. It is certain that no kind of painting can be so cheap, but it possesses, besides, other advantages. In the same day two coats may be laid on and polished, as it dries speedily, and has no smell. If it be required to give it more durability in places exposed to moisture, rub over the painting after it has been polished, the white of an egg. This process will render it as durable as the best oil painting.

49. *Preparation of Red, Grey, Yellow, Brown, White, and Blue Black Colours, that never change, and may be used in Oil or Water.*

RED is made, equal in beauty to Indian red, by calcining some of the pyrites usually found in coal pits; grey, by calcining together blue slate and bone ashes powdered, grinding them together, washing the mixture, and gradually drying it: yellow or masticot, by burning a piece of soft brick, of a yellowish colour, in the fire, grinding a quarter of a pound of flake white to every pound of brick, calcining them and grinding them together, and afterwards washing the mixture to separate the sand, and letting the finer part gradually dry for use. White is made by calcining the bones of sheep trotters in a clear open fire, till they become a perfect white, which will never change. Brown, from bones in a similar manner, only calcining them in a crucible, instead of an open fire; and blue black, by burning vine stalks within a close crucible, and in a slow fire, till they are perfectly charcoal, which must be well ground for use.

50. *To make a valuable Composition for colouring and preserving Gates, Pales, Barns, &c.*

MELT twelve ounces of resin in an iron pot or kettle, add three gallons of train oil, and three or four rolls of brimstone, when the resin and brimstone are melted, and become thin, add as much Spanish brown or red, or yellow ochre, (or any other colour you want) first ground fine as usual with some of the oil, as will give the whole as deep a shade as you like. Then lay it on with a brush, as hot and as thin as you can, some days after the first coat is dry, give it a second. It is well attested, that this will preserve plank for ages, and prevent the weather from driving through brick work.

51. *To make a Varnish proper for Pales, and coarse Wood Work.*

TAKE any quantity of tar, and grind it with as much Spanish brown as it will bear, without rendering it too thick to be used as a paint or varnish, and then spread it on the pales, or other wood, as soon as convenient, for it quickly hardens by keeping.

This mixture must be laid on the wood to be varnished by a large brush, or house painters tool, and the work should then be kept as free from dust and insects as possible, till the varnish be thoroughly dry. It will, if laid on smooth wood, have a very good gloss, and is an excellent preservative of it against moisture, on which account, as well as its being cheaper, it is far preferable to painting, not only for pales, but for weather boarding, and all other kinds of wood work for grosser purposes. Where the glossy brown colour is not liked, the work may be made of a greyish brown, by mixing a small proportion of white lead, or whiting and ivory black, with the Spanish brown.

52. *The best method of obtaining Pure Soft Water, for Medicinal Purposes, without distilling it.*

PLACE an earthen pan in the fields, at a considerable distance from the smoke of any town, to catch the rain as it falls from the clouds. The water should be put into perfectly clean bottles, and the corks well secured with wax, and if the bottles are put into a cool place, the water will keep sweet for several years.

53. *To purify River or any other Muddy Water.*

DISSOLVE half an ounce of alum in a pint of warm water, and stirring it about in a puncheon of water just taken from any river, all the impurities will soon settle to the bottom, and in a day or two, it will become as clear as the finest spring water.

54. *A way of supplying the want of Soft Water, or construction of a Reservoir for Water.*

THIS is effected by digging a round pit, eight or nine feet deep, and as many in diameter, laying a double floor of tiles in tarras at the bottom of it, and working up the sides in the same mortar. This should be shaped in form of a bee-hive, leaving a mouth at top, large enough for a man to enter, which mouth should be covered with a lid, perforated with holes for the admission of air.

The situation should be in some convenient angle, where the rain that falls upon the roofing of a house, &c. may be best collected into one pipe, and by that pipe, conveyed into this reservoir, into which a leaden pump should be inserted for pumping up the water when wanted. If this reservoir is made large enough, hardly any family will ever want water for all the purposes of the kitchen, and though this water will grow fœtid, and will smell disagreeably when fresh out of the pump, yet exposed to the open air for twenty-four hours, it will become perfectly sweet, pure, and limpid.

55. *Easy Method of Raising Water out of very deep Wells.*

THIS method is said to be the invention of a seafaring man, who took the hint from observing the great quantity of water, which every rope brought on board with it, that had been drawn through the water, a circumstance that could escape no person's observation who has been much on board ships, but which, like many other things that pass daily before our eyes, had never been applied to any useful purpose. The application is as simple as the principle.

A grooved wheel, about three feet diameter, is fixed on an axis which turns horizontally over the well, and an endless rope of a sufficient length to reach into the water in the well, passes over it in the groove. On the same axis a winch is fixed at one end to turn it by, and at the other end another wheel loaded with lead, which acts as a fly, to increase the velocity. On turning the wheel each part of the rope, as it comes to the bottom, passes through the water; and on account of the abovementioned property, the water adheres to, and is brought up by it to the top, where it is discharged from the rope into a cistern, placed to receive it by the pressure of the rope upon the wheel in passing over it.

56. *Easy method of raising a great quantity of Water out of Wells in a little time.*

FOR this purpose adapt to the end of the windlass a wheel that may be two or three times the diameter of the windlass, on which a smaller and longer rope may be wound, than that which raises the bucket, so that when the bucket is in the well the small rope is all of it wound on the wheel, the end of which any person may take on his shoulder, and walk or run forward till the bucket be drawn up. In which operation the bucket may contain twenty or thirty gallons, and yet be drawn up with more ease than one of seven or eight the ordinary way. The bucket may also have a round hole in the middle of the bottom, with a valve, so that when it rests on the water the valve may open and the bucket fill, and when the bucket begins to rise the valve closes. This prevents the loss of time consumed in the diving of the bucket. On the wheel may be made teeth, with a ledge of wood so falling on it, that when the bucket is as high as you intend it to be, the ledge may bear against the teeth and stop the return of the bucket. When the bucket is at the top you may have a receiver at hand, and a moveable trough to slip under the bucket, then on raising the valve by a small cord fastened to it in the inside, the water may by it be conveyed into the receiver. By this means many tons of water may be drawn up in a little time.

57. *Method of procuring good Water from Wells.*

IF you wish the water of a well to be clear, and free from any disagreeable taste, the excavation should be made considerably larger than is usually done.

If, for example, you wish to construct a well five feet in diameter, the excavation ought to be from twelve to fifteen feet; a false well is made ten or twelve feet in diameter, in the middle of this large well: the real well is constructed with a diameter of about five feet, but in such a manner that the water may filter through the interstices left between the stones which form the outside of the inner well. The false well is then filled with sand and pebbles, so that the water must first filter through them, before it reaches the real well. By this method you are sure of having filtered water, perfectly clear and fit to drink.

This is an expensive operation, but the expence is amply compensated by the advantage of having limpid and wholesome water.

58. *Easy and expeditious method of dissipating the noxious Vapours found in Wells and other subterraneous Places.*

THE author of this method says, that after various unsuccessful trials, by other means, he was led to it by supposing, that the foul air at the bottom of a well, would necessarily give place to the pure air introduced into it. With this view, he procured a pair of smith's bellows, fixed in a wooden frame, so as to work in the same manner as at the forge. This apparatus being placed on the edge of the well, one end of a leather tube (the hose of a fire-engine) was closely adapted to the nose of the bellows, and the other end was thrown into the well, reaching within one foot of the bottom. At this time the well was so infected, that a candle would not burn at a short distance from the top, but after blowing with his bellows only half an hour, the candle burned bright at the bottom: then without further difficulty, he proceeded in the work, and finished his well.

Wells are often made in a very slight manner, owing to the difficulty of working in them, and there have been several fatal instances of the danger attending the workmen, but by the above method there is neither difficulty nor danger in compleating the work with the utmost facility.

It is obvious that in cleaning vaults, and working in any other subterraneous place, subject to damps, as they are called, the same method would be attended with the same beneficial effect.

59. *Method of making Ponds in dry Countries, for watering Sheep and Cattle.*

MARK out a circular piece of ground, of the diameter of about twenty yards, and dig out one foot of earth so as to leave the sides of perpendicular depth; then begin to form it in the shape of a wooden milk bowl, till the perpendicular depth in the centre be four feet and a half, or five feet: on the bottom and sides spread lime, finely powdered, two or three inches thick; on this lime lay well tempered clay, six or seven inches thick. This clay, when laid on, must be well worked with circular beaters, of a foot diameter and three inches thick, first using the outside edge of the beater, which will indent the clay; then use the flat side so as to leave it with a smooth surface: upon the clay thus prepared lay gravel or chalkstone six inches thick. The gravel should have both the finer and coarser parts screened from it; no more clay should be prepared for the gravel than can be laid and covered the same day, as heat or frost will be equally apt to catch it, which must be particularly guarded against, as it would occasion the pond to lose its water. After the gravel is laid on nothing more is necessary.

A piece of ground should be chosen for this purpose, to which there is a descent from all sides, if it can be found in a proper situation.

Winter, or early in the spring, are the best seasons for making these ponds or reservoirs.

Lay each material of equal thickness, from the centre to the edges of the pond.

If lime can be made fine enough without the use of water, so much the better; if not, use as little as possible.

The clay should have no more water than will serve to make it work readily.

In this manner ponds may be made of any size; the diameter and depth being kept nearly in the same proportion as above directed.

60. *A Repository for Corn, recommended to be used in Stables, superseding the incumbrance of Oat Bins.*

MAKE a conveniency to let the oats down from above, out of a vessel like the hopper of a mill, from which they descend into a square pipe, let into the wall, of about four inches diagonal, which comes down into a cupboard also set in the wall, but with its end so near the bottom, that there shall never be above a gallon, or such small quantity, in the cupboard at a time, which, on being taken away, and given to the horses, is immediately succeeded by another gallon. Thus in the part of the stable where the horses stand there is not an inch of room taken up for the whole provision of oats; and the method has also this further conveniency, that by the motion given to the oats they are kept constantly sweet; the taking away of one gallon moving the whole mass above, which otherwise, by being laid in great quantities, would be apt to become musty.

61. *Method of making Oats prove doubly nutritious in the feeding of Horses.*

THE following important fact, has been confirmed by the earl of Pembroke, that if the oats given to horses, are first broken (not ground) in a mill, the same quantity will prove doubly nutritious. His lordship directed an experiment to be made with six horses; to one set, he ordered the usual quantity of oats, and to the other, one half of the quantity, after a trial of six weeks, the six horses which had been fed with only half the quantity of the oats, grossly broken, and had done the same work, were really in as good, if not better condition, than those which had been fed with the whole quantity unbroken.

A member of the Bath Agricultural Society asserts, that he for several weeks, boiled all the corn given to his horses, and gave them the liquor in which it was boiled; the result was, that instead of six bushels in a crude state, as previously given them, three bushels so prepared was found to answer, and to preserve the horses in a higher degree of vigour, and in better working condition.

62. *The Canada method of shoeing Horses in winter.*

IN Canada, where the winter is never of a less duration than five months, they shoe their horses in the following manner, which serves for the whole winter.

The smith fixes a small piece of steel on the fore-part of each shoe, not tempered too hard, which turns up about two eighths of an inch, in the shape of a horses lancet; the same to the hinder part of the shoe, turned up a little higher than the fore-part and tempered in the same manner.

In going up a hill, the fore-part gives a purchase that assists the horse, and in going down, prevents him sliding forwards. After being used to it for a day, the horses travel without dread or fear; and even in summer, horses employed in drawing heavy waggons, or drays, find great relief in the purchase they have, in going up and down heights, when shod in this manner.

63. *Method of preventing the Feet of Horses from balling with Snow.*

IF the frog in the hoofs of horses be cleaned, and well rubbed with soft soap, previously to their going out in snowy weather, it will effectually prevent their falling, from what is termed balling the snow.

This method cannot be made too public, as a number of accidents happen which might be prevented by this simple precaution.

64. *A Composition to be used as a Substitute for Grease, for Coach Wheels, &c.*

TO one pound of hog's lard add half a pound of black lead, stir and mix these well together, whilst melting over a slow fire.

If the axles and bushes of the wheels be true, a carriage may safely be run one hundred, or one hundred and fifty miles, with once using the above composition.

65. *Description of a quick and easy method of converting Weeds and other Vegetable Matter into Manure.*

THIS manure is nothing more than green vegetable matter, decomposed by quick or fresh burnt lime, upon a layer of vegetable matter, about a foot thick; a very thin layer of lime, beat small, is to be laid, and so on—vegetable matter and then lime alternately. After they have been put together a few hours, the decomposition will begin to take place, and if not prevented, either by a few sods, or a forkfull of the vegetables at hand, the mixture will break out into a blaze, which must, however, be carefully prevented. In about twenty-four hours the process will be compleat, and you will have a quantity of ashes ready to lay on your land at any time you wish. Any and all sorts of vegetables, and weeds of every description, if used green, will answer the purpose. They will doubly serve the farmer, as they will not only be got at a small expence, but will, in time, render his farm more valuable, by its being deprived of all noisome weeds.

The vegetables should be used as soon after they are cut as possible, and the lime as fresh from the kiln as the distance will allow; as on those two circumstances depend the goodness of the composition.

66. *Method of preparing Horn for Lanthorns.*

THE horn, in its natural state, is roasted over a fire composed of the wood of furze, (as this gives a much stonger heat than the prickly branches) when it is sufficiently warmed, so as to become soft, it is slit on one side and spread open between a pair of flat tongs, large enough to hold the horn expanded, a second time over the fire, and bring it to a flatness; it is then put into a press, made of iron plates, perpendicularly bearing against each other; these are heated and greased, and the horn being placed between them is tightened by means of large wedges, driven in at each end or the centre of the press. Here they remain until properly cooled, they are then put into a vessel filled with water, where they soak until soft enough to be pared down to their requisite thinness; this is done with a large knife, worked horizontally on them, after they are fixed on a block similar to that of a fellmonger; and indeed the whole operation of producing their transparency is just in that manner. After being prepared as above the polish is given to them by rubbing whiting and the coal of burnt willow over them, with the hand, after being soaked in urine.

The shavings of the horn are preserved for agricultural purposes, or for chemical operations to procure hartshorn.

Sir George Staunton, in his embassy to China, mentions a method used by the Chinese of preparing horn, for windows, instead of glass, by means of beating it into laminæ, as gold, &c. is beaten into leaves.

67. *An ingenious method of supplying the place of Horn, for Lanthorns, &c.*

THIS method of supplying the place of horn, for lanthorns, &c. has been practised in France. It consists in dipping a piece of network, of very fine brass wire into a strong decoction of isinglass, which fills up the meshes, and is converted by drying into a hard transparent plate. It may be made of any thickness, by dipping the netting a sufficient number of times; and when varnished, for protection against the effects of moisture, is found to be as durable as horn.

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68. *Method to render Linen, Silk, or other similar substance Water Proof*

THE following cheap process is prevalent in China, for oiling silks, cottons, linens, &c. which render them impervious to water, supple, and free from cracking, or sticking together.

Ten gallons of very old linseed, or other vegetable oil, is to be put into an iron pot, capable of holding twenty gallons, to prevent its boiling over; this is to be kept boiling on a brisk fire of coke or charcoal, for three or four hours; and when it has boiled long enough to catch fire, by the introduction of a red-hot poker into it; it is to be permitted to blaze for half an hour, when it becomes tacky, and of a green colour, and is rendered a drying varnish of a supple quality, though somewhat slower in drying than ordinary varnishes.

The linen, silk, &c. is to be equally damped, not to contain a single drop of water, and dipped into the liquid, and wrung, or it may be laid on with a brush. A handkerchief so dipped may be crumpled up in the pocket, and expanded again, without crack or injury. Old oil must be used, it is homogeneous, its component parts are better assimilated, and it does not contain that floating mucilage to be met with in new oils.

Much care is requisite in the process of burning the oil, as the blaze will probably be fifteen feet high, and the smell exceedingly offensive. When the oil is sufficiently burnt, a lid, fastened at the end of a pole, is to be put on, and the crevices stopped with cloths wrung out in water, but if a single drop of water should find its way into the hot oil, the pot will explode with violence; when dipped, the linen, &c. must be hung to dry in a place having a current of fresh air, and free from dust; it may be several days drying, when dry, it will not smell, stick, or crack, but will resist water, and be of great durability.

The materials for umbrellas in this country are prepared somewhat after this manner, but not with that degree of attention to the oil, &c. necessary to put them on a par with the productions of China.

69. *Chinese method of rendering Cloth Water Proof.*

THE following has been announced as the Chinese method of rendering cloth water proof. To one ounce of white wax, melted, add one quart of spirits of turpentine, when thoroughly mixed and cold, dip the cloth into the liquid, and hang it up to drain until it is thoroughly dry. By this method the most open muslin, as well as the strongest cloths, will be rendered impenetrable to the heaviest rain, without the composition even filling up the pores of the finest lawn, or changing in the least the most brilliant colours.

70. *To make Oil Cloth for Hat Cases, Umbrellas, and other uses.*

TAKE drying oil, set it over the fire, and then dissolve resin in it, or which is better, but dearer, gum lac. There must be so much of either as will bring the oil to the consistence of balsam, then add some colour to it, as verdigrease for a green, umber for a hair colour, white lead and lamp black for a grey, or indigo and white lead for a light blue, spread this over canvas or linen cloth, so that it may be fully drenched or glazed over with a brush, and when it is dry no wet can touch it. That made of lac, and applied to fine linen, would make good great coats for those who travel much in all weathers: some have laid this composition on silk. These fine sorts may be rolled up, and put in the pocket, being exceedingly proper for gentlemen, or any that ride out with good cloaths, and would not have them spoiled. Some of this varnish should be laid on the seams after the garment is made, and then no wet can soak through.

71. *Method of filling up Engravings on Silver with a durable Black Enamel, as practised in Persia and India.*

THEY take ½ an ounce of silver, 2½ ounces of copper, 3½ ounces of lead, 12 ounces of sulphur, and 2½ ounces of sal ammoniac. The metals are melted together, and poured into a crucible which has been before filled with pulverized sulphur, made into a paste with water; the crucible is then immediately covered, that the sulphur may not take fire, and this regulus is calcined over a smelting fire until the superfluous sulphur is burnt away. The regulus is then coarsely powdered, and with a solution of sal ammoniac formed into a paste, which is rubbed into the engraving on silver plate. The silver is then wiped clean, and suffered to become so hot under the muffle, that the substance rubbed into the strokes of the engraving melts, and adheres to the metal. The silver is afterwards wetted with the solution of sal ammoniac, and again placed under the muffle till it becomes red hot. The engraved surface may then be smoothed and polished without any danger of the black substance, which is an artificial kind of silver ore, either dropping out or decaying. In this manner is all the silver plate brought from Russia, ornamented with black engraved figures, &c.

72. *The Armenian Jewellers' method of preparing Foils for Diamonds and other precious Stones.*

THE Armenian Jewellers set precious stones, particularly diamonds, to much advantage with a foil, which under roses or half brilliants, is remarkably beautiful, and is not subject to tarnish. Their method is as follows. An agate is cut, and highly polished, of the shape desired; in a block of lead is formed a cavity of about the size of the agate, and over it is placed a bit of tin, scraped bright, of the thickness of strong brown paper. The agate is then placed on the tin, over the cavity, and struck with a mallet. The beautiful polish the tin receives is scarcely to be imagined. This is in general kept a secret; and such foils sell for half and three-quarters of a dollar each.

73. *A Process for separating Gold and Silver from Lace without burning it.*

CUT the lace in pieces, and having separated the thread from it by which it was sewed to the garment, tie it up in a linen cloth, and boil it in soap lyes, diluted with water, till you perceive it is diminished in bulk, which will take up but a little time, unless the quantity of lace be very considerable. Then take the cloth out of the lye, and wash it several times in cold water, squeezing it pretty hard with your foot, or beating it with a mallet, to clear it of the soap lye, then untie the cloth, and you will have the metallic part of the lace pure, and no where altered in colour, or diminished in weight.

This method is far more convenient and less troublesome than the common way of burning, and as a small quantity of the lye will be sufficient, the expence will be trifling, especially as the same lye may be used several times, if cleared of the silky calcination. It may be done in either an iron or copper vessel.

The lye may be had at the soap-boilers,* or it may be made of pearl ash and quick lime boiled together in a sufficient quantity of water.

The reason of this sudden change in the lace will be evident to those who are acquainted with chemistry; for silk, on which all our laces are wove, is an animal substance, and all animal substances are soluble in alkalies, especially when rendered more caustic by the addition of quick lime, but the linen you tie it up in being a vegetable, will remain unaltered.

74. *Method of giving a lustre to Silver Plate.*

DISSOLVE a quantity of alum in water, so as to make a pretty strong brine, which you must scum very carefully; add some soap to it, and when you wish to use it dip a piece of linen rag in it, and rub it over your pieces of plate. This process will add much to their lustre.

75. *To make an Oil which is useful for Watches, &c. and preserves Metals from Rust.*

AN eel is to be half fried, and its fat carefully expressed and clarified. This oil is the most subtle for watches and other diminutive machinery, as it never thickens, and consequently preserves the iron from the effects of rust.

of the gums and the spirits could be ascertained. When you have brought it to a proper temper, warm the silvered plate before the fire (if a clock face, take care not to melt the wax) and with a flat camel's hair pencil, stroke it all over until no white streaks appear. This will preserve silvering many years.

79. *To make a Lacquer for Brass.*

TAKE eight ounces of spirits of wine, and one ounce of annotto, well bruised; mix this in a bottle by itself; then take one ounce of gamboge, and mix it in like manner, to the same quantity of spirits: also bruised saffron, steeped in spirits, to nearly the same proportion. After this take seed lac varnish, what quantity you please, and you may brighten it to your mind by the above mixture: if it be too yellow, add a little more from the annotto bottle; and if it be too red, add a little more from the gamboge, or saffron bottle: if too strong, add a little spirits of wine, &c. Thus you may temper lacquer, or varnish to what degree of perfection you please.

80. *Easy method of Gilding Silver.*

DISSOLVE gold in the nitro muriatic acid, (aqua regia) and dip some linen rags in the solution; then burn them, and carefully preserve the ashes, which will be very black, and heavier than common. When any thing is to be gilded, it must be previously well burnished: a piece of cork is then to be dipped, first into a solution of salt in water, and afterwards into the black powder; and the piece, after being rubbed with it, must be burnished. This powder is frequently used for gilding delicate articles of silver.

81. *An improved process for Gilding Iron or Steel.*

THIS process, which is less known among artists than it deserves to be, may prove useful to those who have occasion to gild iron or steel. The first part of the process consists in pouring over a solution of gold in nitro muriatic acid (aqua regia) about twice as much ether, which must be done with caution, and in a large vessel. These liquids must then be shaken together; as soon as the mixture is at rest, the ether will be seen to separate itself from the nitro muriatic acid, and to float on the surface. The nitro muriatic acid becomes more transparent, and the ether darker, than they were before; the reason of which is, that the ether has taken the gold from the acid.

The whole mixture is then to be poured into a glass funnel, the lower aperture of which is small, but this aperture must not be opened till the fluids have completely separated themselves from each other. It is then to be opened, by which means the liquid which has taken the lowest place by its greater gravity, viz. the nitro muriatic acid, will run off, after which the aperture is to be shut, and the funnel will then be found to contain nothing but ether, mixed with the gold, which is to be put into well closed bottles, and preserved for use.

In order to gild iron or steel, the metal must first be well polished with the finest emery, or rather with the finest crocus martis, or colcothar of vitriol, and common brandy. The auriferous ether is then to be applied with a small brush; the ether soon evaporates, and the gold remains on the surface of the metal. The metal may then be put into the fire and afterwards polished. By means of this auriferous ether, all kinds of figures may be delineated on iron, by employing a pen, or fine brush. It is in this manner, we believe, that the Sohlinger sabre blades are gilded.

Instead of ether, the essential oils may be used; such as oil of turpentine, or oil of lavender, which will also take gold from its solution.

82. *Method of protecting Gilders, Jewellers and others, from the pernicious effects of Charcoal.*

IT is advisable for those who are exposed to the vapour of charcoal, particularly gilders, jewellers, refiners of metals, &c. to place a flat vessel, filled with lime water, near the stove in which the charcoal is burnt.

The lime strongly attacks the mephitic gas, evolved by the ignited charcoal, and thus preserves the purity of the air. When the surface of the water becomes covered with a film or pellicle, it must be changed for a fresh quantity.

83. *The magnifying Watch Lamp.*

IT consists of a stand with three claws, the pillar of which is made hollow, for the purpose of receiving a water candlestick, of an inch diameter. On the top of the pillar, by means of two hinges and a bolt, is fixed on a small proportionable table, a box of six sides, lined with brass, tin, or any shining metal, nine inches deep and six inches diameter. In the center of one of the sides is fixed a lens double convex, of at least three inches and a half diameter.

The center of the side, directly opposite to the lens, is perforated so as to receive the dial plate of the watch, the body of which is contained on the outside by means of a hollow slide.

When the box is lighted, by a common watch light, the figures are magnified nearly to the size of those of an ordinary clock.

This machine is very simple, and may be made at a small expence.

The light is burnt in a manner perfectly safe, and the hour of the night is discovered in a moment.

84. *To make a Clock go, perpetually, by the influence of the Celestial Bodies.*

THE construction of the movements in this clock is the same with those in common use; it differs from those only in the situation in which it is placed, and the manner in which it is wound up.

This clock is to be placed near a wall, by, or against which, the tide constantly flows. To each of the barrels, round which the string that carries the weight is wound, there must hang a bucket, and into that, when the tide rises to a certain height, the water runs, by means of a pipe fixed in the wall. The bucket then overbalancing the weight descends, and winds up the clock; but when it comes to a certain depth, it is taken by a catch, fixed in the wall, which by turning it over, discharges the water. The weights of the clock then descend in the usual manner, and the buckets are drawn up.

Now as the clock is kept in motion by the tide, and as the tide proceeds from the influence of the sun and moon, it necessarily follows, that the motion of the clock proceeds from the same cause, and that as long as the parts of the machine remain, its motion will be perpetual.

25. *To make an imitation of Enamel on Tin, for Chimney Branches, &c.*

GET a sheet of block tin, very clean, and cut it in the form, shape and figure you chuse to make your flowers and other things. Grind what colours you propose to make use of, with clean water, and each separately; then let them dry, When you want to employ them, dilute them, each apart, with liquid varnish, and lay them on with the brush. Set the work in the open air, that the colours may not run, and when they are a little thickened and consolidated, finish drying them before a gentle fire.

86. *To make Flowers of Isinglass, in imitation of Enamel.*

TAKE half an ounce of the clearest and best isinglass, dissolve it over the fire in half a pint of water, then strain it through a cloth; let it stand till it is cold, and you see it is a strong jelly. Then take an ounce of flake white, ground very fine; dissolve as much of your isinglass as will make it pretty thick; take fine silvered wire, and twist it double on a wheel, like thread, and make it up in flowers, the form of violets, auriculas, polyanthus, primroses, jonquils, &c. according to your fancy; keep your enamel warm, and dip in your flowers, and they will all fill up and look like enamelled work; paint them to resemble nature as much as possible; set them to dry, beat the white of an egg to a froth, and let it stand; take the clear and mix it with a syrup of white sugar candy, and varnish them over with it, and they will be extremely pretty.

87. *The Chinese method of making the Thin Lead that lines Tea Chests.*

THE lead which lines the Chinese tea boxes is reduced to a thinness, which, it is said, European plumbers cannot imitate. The following account of the process by which the plates are formed, was communicated to a writer in the Gentleman's Magazine, by an intelligent mate of an East Indiaman.

The caster sits by a pot containing the melted metal, and has two large stones, the under one fixed, the upper moveable, directly before him. He raises the upper stone by pressing his foot upon the side of it, and with an iron ladle pours into the opening a proper quantity of the fluid metal. He then immediately lets fall the upper stone, and by that means forms the lead into a thin irregular plate, which is afterwards cut into a proper shape. The surfaces of the stones, where they touch each other, are exactly ground together.

88. *The method of making the Æolian Harp, which, by the help of the Wind only, gives very pleasing harmonious Sounds.*

IT is a long narrow box of thin deal, about thirty inches long, five inches broad, and one inch and three-quarters deep, with a circle in the middle of the upper side or belly, about one inch and a half diameter, pierced with small holes. On this side are from seven to fifteen strings, of very fine gut, stretched over bridges at each end, like the bridge of a fiddle, and screwed up with screw pins. The strings are all tuned to the same note, and the instrument is placed in some current of air, such as a window with the sash just raised. The air brushing the strings will excite different tones of sound, and sometimes bring out all the tones in full concert, so as to occasion very pleasing gradations of sound.

89. *Method of preserving Snakes.*

THE following account of an easy method of preserving snakes may not be unacceptable.

When the snake is killed, it must first be washed, and its surface freed from all soil and dirt; then it is to be put into a glass of a proper size, the tail first, and afterwards the rest of the body, winding it in spiral ascending circles, and disposing the back, which is always the most beautiful, outwardly. A thread, connected to a small glass bead is, by the help of a needle, to be passed through the upper jaw, from within outwardly, and then through the cork of the bottle, where it must be fastened: by this means the head will be drawn into a natural posture, and the mouth kept open by the bead, whereby the teeth, &c. will be discovered. The glass is then to be filled with rum, and the cork sealed down to prevent its exhalation. A label, containing the name and properties of the snake, is then to be affixed to the wax over the cork, and in this manner the snake will make a beautiful appearance, and may be thus preserved a great number of years; nor will the spirits impair or change the lustre of its colours.

90. *Method of closing wide mouthed Vessels perfectly air tight, and of preventing the Spirits from evaporating in which any subject is preserved.*

A piece of bladder, soaked in warm water, having been stretched tightly over the mouth of the jar, and tied, a piece of the thickest tinfoil, previously examined by interposing it between the eye and the sun, in order to detect the small fissures which are frequently found in it, is to be laid smoothly over it, with the palm of the hand, without stretching, and that being also tied, a second piece of bladder again stretched over it; or where the vessel may require to be sometimes opened, the foil may be laid smoothly over the surface of a bung, and a piece of bladder being stretched over it, the whole applied in the usual way.

91. *Method of recovering the brightness of Crystal, when it has become foul and dark, without hurting the Polish.*

WHEN any piece of workmanship, of natural crystal, is become foul and dark, the following method is to be used for recovering its brightness, without hurting the polish. Mix together six parts of common water, and one part of brandy, boil them over a brisk fire, and let the crystal be kept in it in a boiling state a quarter of an hour; then take it out, and rub it carefully over with a brush dipped in the same liquor. After this it is to be wiped with a napkin, aud by that means its surface will be perfectly cleaned, and rendered as bright as at first, without any injury to the points of the cutting, or the polish of the planes or faces, which would probably have happened had the cleaning been attempted by mere rubbing with a cloth.

92. *Method of cleaning tarnished Speculums.*

GET a little of the strongest soap ley from the soap-makers, and having laid the speculum on a table, with its face upwards, put on as much of the ley as it will hold, and let it remain about an hour; then rub it softly with a piece of silk, or muslin, till the ley is all gone. Then put on some spirit of wine, and rub it dry with another part of the silk, or muslin. If the speculum will not perform well after this, it must be new polished.

A few faint spots of tarnish may be rubbed off with spirits of wine only, without the ley.

93. *To make an Oil as sweet and as fine as that we import from Florence, from an English Plant.*

IT is imagined that a sufficiency of oil for edible purposes, cannot be easily obtained from any plant of English growth. But this is a false supposition; finer and sweeter oil no country can supply than what we can, with little trouble and expence, prepare for ourselves.

The tall annual sun flower will prove this; its seed bruised and pressed will yield an oil as sweet and as fine as that we import from Florence. From a bushel of this seed a gallon of oil may be drawn, and with this advantage, that it can be obtained at any time, quite soft, bland and fresh. The seed also, and the moss that remain after the expression of the oil, are of excellent use to feed and fatten hogs, poultry, &c.

94. *To Season and render Green Timber immediately fit for use.*

AFTER cutting down the timber from the stock, take off the outer bark immediately, and also the inner rind, clean to the wood; cut it up to the different purposes for which it may be wanted, whether scantlings for roofings, joists, planks, deals, or the like. After preparing them for their proper use, steep them in lime water a few days, or pay them over with a little of the lime, along with the water. The hotter it is used after the lime is slacked, so much the better. Lime water is made by slacking the lime shells in water. This will answer equally well for round trees. The author of this method says, he has been for a great number of years past, used to take down and repair both ancient and modern buildings, in which a good deal of Scots fir had been used, but he never found one inch either rotten or worm eaten, where it was in the least connected with lime, and kept dry; on the contrary, he found it more hard and firm than when first used.

95. *To give a superior Polish to Tobacco Pipes.*

The pipes, when baked, are covered with a glazing, or varnish, and afterwards rubbed with a cloth. This glazing consists of a quarter of a pound of soap, two ounces of white wax, and one ounce of gum arabic, or tragacanth, which are all boiled together in five pints of water for a few minutes.

96. *To make Busts of Clay look like Bronze, and Casts of Plaster of Paris look like Marble.*

THE method of giving clay models the appearance of bronze, and hardening casts in plaster, is simply by waxing them, which is done by making the clay model moderately hot by the fire, and then pouring melted bees wax on it, and continuing to do so till such time as the colour becomes sufficiently dark.

Casts in plaster must not be made nearly so hot as the clay models, the wax must be of the purest sort, aud the cast must be dipped into the vessel of melted wax.

97. *Method of preparing the Dutch Turnsol Blue*

IT is well known that the Dutch kept their process for preparing turnsol blue a very great secret, and in order to mislead the public, pretended that it was made from rags dyed with the juice of the sun flower, (helianthus) from which it obtained its name ; since the late revolution, however, in Holland, the true method employed by the Dutch for preparing this colour has been discovered, and the process is as follows.

That kind of lichen called orchil, (lichen rocella) or when that cannot be procured, the large oak moss, after being dried and cleansed, is reduced to powder, and by means of a kind of oil press, the powder is forced through a brass sieve, the holes of which are small. The sifted powder is then thrown into a trough, and mixed with an alkali called vetas, which is nothing else than the ashes of wine lees, in the proportion of half a pound of ashes to one pound of powder. This mixture is moistened with a little human urine,. for that of other animals contains less of ammonia, by which a fermentation is produced, and the moisture is still kept up by the addition of more urine; as soon as the mixture assumes a red colour it is poured into another trough, is again moistened with urine, and then stirred round, in order that the fermentation may be renewed.

In the course of a few days it acquires a blueish colour, and is then mixed with a third part of very pure pulverized potash, after which the mixture is put into wooden pails three feet in height, and about half a foot broad, when the third fermentation takes place, and the paste has acquired a considerably dark blue colour, it is mixed with chalk, or pulverized marble, and stirred well round, that the whole may be completely united. This last substance gives the colour no higher quality, but is intended merely to add to the weight.

The blue prepared in this manner is poured into oblong square iron moulds, and the cakes, when formed, are placed upon fir boards, or an airy floor, in order to dry, after which they are packed up for sale.

98. *Method of preparing Naples Yellow.*

THE beautiful yellow colour commonly sold under the name of Naples yellow is well known, those who buy it are often imposed upon, by being told that it is a substance produced from Mount Vesuvius.

The first author who has spoken of it as a composition by art is Mr. Beckmann, who has taken his process from a work written by the Abbé Passeri.

According to the latter it is composed of the following substances, viz. one pound of antimony, one pound and a half of lead, half an ounce of alum, and the same quantity of common salt. With respect to the process or mode of preparation, Passeri is silent; probably the antimony and lead should be calcined together, afterwards the other ingredients added, and then the whole mixture undergo a second calcination in the manner described.

The second author who speaks of the composition of this colour is M. Fougeroux de Bondaroy, and upon the whole his process agrees with the preceding.

To procure this colour we must take twelve ounces of white lead, three ounces of diaphoretic antimony, alum and sal ammoniac of each one ounce, all these must be ground together dry upon a levigating stone; they must then be put into an open crucible, and exposed to a gentle fire for some hours, the fire is afterwards to be increased during a certain time, and finally the mixture is to continue three hours in a degree of heat sufficient to keep the crucible red hot. The mass will then be found to have acquired a beautiful yellow colour. If it is wished to be more of the colour of gold, a greater quantity of diaphoretic antimony and sal ammoniac must be added to the other ingredients.

It is probable that instead of diaphoretic antimony the grey calx of antimony might be used.

99. *The German method of preparing Prussian Blue.*

ANY quantity of horns and hoofs is mixed with an equal weight of chippings of leather, and the whole submitted to distillation in a large iron retort, fixed in a reverberatory furnace; the oil and impure ammonia resulting from this process are collected in a receiver, and the distillation is carried on at a high heat, till no fluid or vapours of any kind come over. The oil and alkali are disposed of to different manufacturers, and the black spongy coal, remaining in the retort, is the only part made use of in the preparation of the Prussian blue.

Ten pounds of this coal, and thirty pounds of common potash, are reduced together to a coarse powder, and heated to redness in an iron pot; by degrees the mass is brought into a state of semifusion, in which it is suffered to continue nearly twelve hours, at the end of this time, when the matter gives out a strong odour of liver of sulphur, it is taken out red hot, and thrown into a boiler of water, where it undergoes ebullition for about half an hour. The clear liquor is separated by filtration, and the residue is boiled in fresh parcels of water till all the saline matter is extracted, these different lixiviums are then mixed together. Four pounds of alum, and one and a half of green vitriol, are dissolved in warm water, and this solution is added to the former; a copious whitish precipitate is immediately deposited, which, being collected and washed, acquires, by an exposure to the air, a beautiful blue colour.

A method differing in some degree from the above is practised in a few manufactories. Six pounds of chippings of leather, six pounds of hoofs or horns, and ten pounds of common pot ash are boiled together in an iron pot to dryness, the residue is then mixed with two pounds of crude tartar, and by means of a strong fire brought into fusion. The lixiviation is conducted in the usual way, and a solution of five pounds of green vitriol and fifteen of alum being added, a precipitate takes place, which is the Prussian blue.

100. *Method of Vein Marbling and Staining Silk, Linen, Cotton, Paper, &c.*

MAKE a middling thick size or paste of flour and water, to which add a little powdered alum, and then boil it in the manner of glovers, &c. paste, put some of the size when cool into several pots, and mix with it such kind of colours or other matters used in staining and dying as are held in esteem. Have ready a painter's brush to each pot, and with any of the brushes spread a quantity of the fore-mentioned coloured size very even on a flat piece of marble, or other kind of smooth stone, or on a smooth board or a table, according to the length and width of the piece of silk, linen, cotton, or sheet of paper; on the coloured size thus spread lay a strong plate of glass, or one of tin, or copper; or a thin piece of board, pressing the plate (of whatever sort) gently with the hand on every part, raise the plate by lifting up one end, and it will be found veined in every direction by the adhesiveness of the size; immediately lay the plate thus prepared on the silk, linen, or other article, and with the hand again gently press on every part of the plate, which will vein or marble the silk, linen, &c. with the same figures as were on the sized plate. If the plate of glass (which is preferable, but exceptionable on account of its brittleness) be not pressed too hard, a second impression, with a beautiful sort of smaller sized veins, may be had from the first colouring, and if two different colours are desired on the same surface, there needs only a repetition of the process, with the size containing staining ingredients and the other favourite colouring substances; a neat sort of tortoise shell appearance, and a great variety of expressive figures may be produced this way, as also by various actions of the fingers upon the plate before the size loses its moisture, and likewise by many times folding the silk, linen, or other material of flexible texture.

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101. *Method of obtaining Fresh Water from the Sea.*

THE method of obtaining fresh water from the sea is by distillation, which was introduced into the English navy in the year 1770, by Dr. Irving, for which he obtained a parliamentary reward of 5000l.

In order that the reader may have a clear notion of Dr. Irving's method, let us suppose a tea-kettle to be made without a spout, and with a hole in the lid, in the place of the knob; the kettle being filled with sea water, the fresh vapour, which arises from the water as it boils, will issue through the hole in the lid; into that hole fit the mouth of a tobacco pipe, letting the steam have a little inclination downwards, then will the vapour of fresh water take its course through the stem of the tube, and may be collected by fitting a proper vessel to its end.

This would be an apt representation of Dr. Irving's contrivance, in which he has adapted a tin, or iron, or copper tube, of suitable dimensions, to the lid of the common kettle used for boiling the provisions on board a ship; the fresh vapour, which arises from boiling sea water in the kettle, passes through this tube into a hogshead, which serves as a receiver, and in order that the vapour may be readily condensed, the tube is kept cool by being constantly wetted with a mop dipped in cold sea water.

Dr. Irving particularly remarks, that only three-fourths of the sea water should be distilled, as the water distilled from the remaining concentrated brine is found to have a disagreeable taste, and as the farther continuation of the distillation is apt to be injurious to the vessels.

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102. *Method of rendering Sea Water capable of Washing Linen.*

IT is well known that sea water cannot be employed for washing clothes.—It refuses to dissolve soap, and possesses the properties of hard water in perfection.

This is a great inconvenience to seamen, whose allowance of fresh water is necessarily limited, and it prevents them from enjoying many of those comforts of cleanliness which contribute not a little to health. The method of removing this defect is exceedingly simple, and by no means expensive. It has lately been pointed out by Dr. Mitchell, of New York, and ought to be made as public as possible, for the sake of our sailors. Drop into sea water a solution of soda, or potash, and it becomes milky, in consequence of the decomposition of the earthy salts, and the precipitation of the earths. This addition renders it soft, and capable of washing. Its milkiness does no injury, and need not therefore excite apprehension.

103. *Method of preserving Water sweet for Years.*

IT has been proved by experiments, that casks fired in the making, till a thin crust of charry matter is formed over the whole internal surface of the staves, will preserve the watdr put into them perfectly sweet for years.

The heads of the casks must also be charred, and great care is to be taken in fitting the heads, that as few chips may be made as possible, because every fresh spot is liable to taint the water; casks finished in this way are equally useful for spirits of all kinds, wines, and malt liquors; and the casks when emptied will not become musty.

104. *Method of preserving Sea Bread from Weavils.*

THE fatal effects of the weavil in sea bread have been severely felt by seamen employed on long voyages; rewards have been humanely offered by the legislature for a cure or preventive, but hitherto without success. The following fact was discovered by accident, and is now offered to the public as a hint worthy of the attention of those who may be employed in supplying ships with provisions, or to captains and owners of vessels, and may, in all probability, lessen, if not wholly remove, an inconvenience so injurious to our invaluable navigation.

A bag belonging to a powder mill fell into a cauldron of liquid nitre, it was immediately taken out, plunged into cold water, and hung up to dry. Several days after this circumstance, the bag was filled with sea biscuit, and sent on board a West Indiaman, where it was stowed away amongst the captain's stock. The vessel was nine months out of England before she proceeded on her passage home, when she got becalmed, and remained so long in that situation, that her crew were forced to be put on half allowance,—more particularly so, as their bread was much destroyed by the weavils, and was hourly consuming. The captain at this time wishing to make use of the bag above-mentioned, which had not been opened since the ship left England, ordered it to be examined, when, greatly to his surprise, the whole contents were found to be perfectly sound, without any appearance of having been injured by any insect whatever, a circumstance solely to be attributed to the quality of the bag.

105. *Method of preserving Potatoes, fit for Use, many Years.*

IT has been accurately ascertained that potatoes, being washed and afterwards cut into slices (in a mill, or by any other mechanical mode) and then dried on a malt kiln, till all the moisture be exhausted, may be certainly preserved for many years, and be as fit for use afterwards as before they were dried. They have also been peeled, and then sliced and dried hard enough to bear grinding in a common grist mill, from whence the flour has been barrelled and sent to the West Indies, and returned to this country, the whole process taking up four years. When both the slices and the meal have been as good and free from mould, or any bad flavour, as when they were first manufactured. The celebrated Doctor Franklin recommends bread treated after the same process, as the best for a sea store—it is first sliced and then baked. This, he says, was the original biscuit.

106. *Method of salting Meat for the use of the Navy, which will keep good several Years.*

THE following method is recommended by the late Admiral Sir Charles Knowles. When the ox is killed, let it be skinned, and cut up into pieces fit for use as quickly as possible, and salted while the meat is hot. For which purpose a sufficient quantity of salt petre and bay salt, of each equal parts, must be pounded together, and made hot in an oven: with this sprinkle the meat, in the proportion of about two ounces to the pound: then lay the pieces on shelving boards to drain for 24 hours, which done, turn them, and repeat the same operation, and let them lie for 24 hours longer. By this time the salt will be all melted, and have penetrated the meat, and the pieces be drained off; each piece must then be wiped dry with clean coarse cloths.

A sufficient quantity of common salt must then be made hot, also in an oven, and mixed, when taken out, with about one third of brown sugar; then the casks being ready, rub each piece well with this mixture, and pack them well down, allowing about half a pound of the salt and sugar to each pound of meat, and it will keep good for several years.

It is best to proportion the casks to the quantity used at one time, as the less it is exposed to the air the better.

The same process does for pork, only a larger quantity of salt and less sugar must be used, but the preservation of both depends equally upon the meat being hot when first salted.

One pound of beef requires two ounces of salt petre, and two ounces of bay salt, because it is to be sprinkled twice, an ounce of each to a pound of beef both times.

107. *Method to prevent Ships from Leaking though their Bottoms should be eaten by Worms, and no longer fit for service; also to free them from Vermin.*

First caulk well the inside planks or lining, then fill the vacant space between the timbers and the out and inside planks with boiling pitch or resin, so high as the main gun deck. The pitch being put in very hot, will run into the smallest cranny, and make the ship as tight as a bottle, and at the same time ballast her. There will be no room for vermin, as rats, &c. and the pitch will serve many uses when taken out, and therefore will not ultimately be a great expence.

108. *Method of trying the goodness of Timber for Ship Building, used in the Arsenal of Venice.*

ONE person applies his ear to the centre of one end of the trunk, while another, with a key, hits the other end with a gentle stroke. If the tree be sound and good, the stroke will be distinctly heard at the other end, though the tree should be 100 feet or more in length.

109. *An easy method of renewing fresh Air in the Holds and Apartments of Transport Ships, and other crowded Vessels.*

M. LE ROY, some years ago, laid before the French Academy of Sciences, a memoir, proposing an easy method of renewing fresh air in the holds and apartments of transport ships, and other crowded vessels.

The simplicity of his proposition recommends it, as a salutary expedient to the maritime part of mankind.

A large sail is wrapped up in the form of a funnel, the wide mouth of which is kept expanded by a circle of cane, or whalebone. This is to be turned to windward, and the small end terminates in a long pipe, by which the fresh air is conveyed at pleasure to different parts of the ship.

110. *To make a Boat go of itself up a rapid Current.*

THE more rapid a river is, the easier it is to make a boat go of itself up against the current, by a rope, and a wheel with its axletree, that has wings, like the wings, or sweeps, of a mill wheel.

Fix the wheel, with its axletree, at the place to which you would have the boat conducted, and let its sweeps be as deep in the water as there is occasion for turning it round, tie a rope to the boat, and to the axletree of the wheel, which, turning with its axletree by the motion of the water, will wind up the rope on its axletree, and so drag it against the current to the place proposed, which it will reach so much the sooner, as the current is rapid, the rapidity quickening the motion of the wheel.

111. *Description of a Machine for Pumping Vessels at Sea, without the labour of Men.*

WHEN a vessel springs a leak at sea, which cannot be discovered, instead of exhausting the crew by continual working at the pumps, they may form, with very little trouble, a machine to discharge the water, which will work itself, without any assistance from the hands on board.

Let a spar, or spare top-mast, be cut to the length of eight or ten feet, or more, according to the size of the vessel; mortice four holes through the thickest end, through which run four oars, fixing them tight, exactly in the middle. To the four handles nail on four blades, (made of staves) the size of the other ends, which will form a very good water wheel if the oars be strong: then fix into the opposite end what is commonly called a crank; the iron handle of a grindstone would suit extremely well: if not to be had, any strong bar of iron may be bent into that form, wedging it tight to prevent its twisting round. Then nail up a new pair of chaps on the forepart of the pump, for a new handle to be fixed in, which will point with its outer end to the bow of the vessel; this handle will be short on the outside, but as long on the inside as the diameter of the bore of the pump will admit, in order that the spear may be plunged the deeper, and of course make the longer stroke. The handle must be large enough to have a slit sawed up it sufficient to admit a stave edgewise, which must be fastened with a strong iron pin on which it may work. The lower end of the stave must be bored to admit the round end of the crank; then fix the shaft, with the oars (or arms) over the gun wale, on two crotches, one spiked to the gun-wale and the other near the pump, cutting in the shaft a circular notch, as well to make it run easier by lessening the friction, as to keep the whole steady. A bolt must be fixed in each crotch close over the shaft, to keep it from rising. As soon as the wheel touches the water it will turn round, and the crank, by means of the stave fixed on its end, will work the handle of the pump.

112. *Methods of affording Relief to Mariners in Cases of Shipwreck.*

THE following plans for affording relief in cases of shipwreck, having been laid before the Trinity-House at Leith, have, after mature deliberation, met the entire and hearty approbation of that respectable body of experienced seamen, and as a mark of that approbation, they have given them a place in their records.

Let a quantity of ballast, even more than what is commonly used for sailing, be laid in the bottom of the boat, over this lay bags filled with cork, prepared for the purpose, and numbered according to their places, and if considerably higher than the gun-wales, so much the better; a sail or part of one folded may be thrown over from stem to stern, to combine and unite the several parts; and lastly, the whole is to be secured together by passing ropes by so many turns as may be deemed sufficient, round and round over the gun-wales, and under the keel, and these, if necessary, may be hitched by a turn or two taken lengthwise.

Every person, either on board or holding by the boat, so prepared, is almost absolutely certain of being carried safe through any breach whatever.

When no such preparation of cork has been made, the following is proposed as the next best.

Let a quantity of ballast, as coals in canvas, be secured in its place, as well as circumstances will admit; then take an empty water cask, (beer cask, or any others that are tight) and fill the boat with them, and if the bilge of the cask rises considerably higher than the gun-wales, it may be so much the better: let a sail then be thrown in to jam the cask and ballast in their places, as well as to combine and unite the several parts by covering all fore and aft; and lastly, let the whole be lashed and secured together, in the manner above stated. It is believed the boat in this trim would always continue upright, on her keel, be lively and buoyant in the water, and sufficient efficacy to support the crew of any ordinary vessel, till drifted within their own depth.

It frequently happens that after men have gained the shore, they perish of cold for want of dry clothes. As a remedy for this, every man should try to secure one or two flannel or woollen shirts, by wrapping them up tightly in a piece of oiled cloth or silk; and to guard tearing, the last might be covered with canvas, or inclosed in a tin box.

113. *A contrivance to prevent Drowning.*

FOR this purpose you must have a cork waistcoat, composed of four pieces of cork, two for the breasts and two for the back, each pretty near in length and breadth to the quarters of a waistcoat, without flaps; the whole is covered with a coarse canvas, with two holes to put the arms through, there is a space left between the two back pieces, and the same betwixt each back and breast piece, that they may fit the easier to the body. By this means the waistcoat is open only before, and may be fastened on the wearer with strings; or if it should be thought more secure, with buckles and leather straps. This waistcoat may be made up for about five or six shillings expence.

If those who use the sea occasionally, and especially those who are obliged to be almost constantly there, were to have these waistcoats, it would be next to impossible that they should be drowned.

It would be of vast service to those who, for their health sake, bathe in the sea; and even the most timorous and delicate young lady might safely venture, with one of these waistcoats, into a rough sea. I need not say how useful they would be to the navy, and how many lives they would save.

144. *A method for taking an Impression from a Copper Plate on Paris Plaster, with Colours, as in common Prints.*

LET the plate be filled with ink, (made of the best ivory black, mixed with drying linseed oil, and ground very fine on a painter's stone) and the surface cleaned with the hand and whitening, as common copper-plate printing; provide yourself with a board about half an inch thick, just the size of the plate, round the edge of this wrap some stiff paper raised half an inch above the surface on one side, and level on the other, in form of a trough, into this put your plate with the prepared side upwards, then mix your

Paris plaster with water to a proper consistency, and pour it on the plate, then lifting up the trough, let it fall flat upon the table; again to drive the bubbles of air from the plate through the surface of the plaster, which after you have repeated about twelve times, let it stand an hour, afterwards take the plate out of the trough, and the plaster now hardened from the plate, and you will have a very neat impression on the plaster. fit to put in a frame, and far preferable to the best prints.

115. *The Method of taking off neat Casts from Medals, Coins, &c. which may be made to look like Silver or Gold.*

BY forming a coat or layer of thin metal over the plaster of Paris, it will be a considerable defence. Tin is the cheapest and most convenient metal for the purpose, as it is sufficiently flexible, and at the same time very much resembles silver. The tinfoil is of the same kind with that used for silvering looking-glasses. It should be laid over the medal or coin intended to be taken off, and then rubbed either with a brush, the point of a skewer, or a pin, till it has received perfectly the impression of the medal, the tinfoil should now be pared off round the edges of the medal, till it is brought to the same circumference. The medal must then be reversed, and the tinfoil will then drop off into a chip box or mould ready to receive it, the concave side of the foil, or that which is laid on the face of the medal, being uppermost; upon this pour plaster of Paris, made in the usual manner, and when dry the cast figure may be taken out of the box or mould with the tinfoil sticking on the plaster, the convex side being now uppermost again, in which position it is to be kept in the cabinet after it becomes dry. To have an impression very perfect the thinnest tinfoil should be made use of.

The impressions taken in the foregoing manner, almost equal silver medals in beauty, and are very durable.

If the box or mould be rather larger than the impression of tinfoil, the plaster, when poured on, runs round its edges, and forms a kind of white frame or circular border round the foil, whence the new made medal appears more neat and beautiful.

If this tinfoil be gilt with gold leaf, by means of thin isinglass glue, the medal will resemble gold.

116. *An easy Method of procuring a fine Impression or Figure of Medals and Coins.*

TAKE a perfect and sharp impression in the finest black sealing wax of the coin or medal you desire, but cut away the wax, round the edges of the impression, then with a preparation of gum water, of the colour you would have the picture, spread the paint upon the wax impression, with a fine hair pencil, observing to work it into all the sinking or hollow places, these being the rising parts of the medal, and the colour must be carefully taken from the other parts with a wet finger; then take a piece of very thin post paper, a little larger than the medal, and moisten it quite through, place it on the wax impression, and on the back of the paper lay three or four pieces of thin woollen cloth, or flannel, of about the same size. The impression, with its coverings, should be placed between two smooth iron plates, about two inches square, and one-tenth of an inch thick, these must be carefully put into a small press made of two plates of iron, about five inches and a half long, one inch and a half wide, and half an inch in thickness, having a couple of long male screws running through them, with a turning female screw on each, to force the plates together; these being brought evenly together by means of the screws, will take off a true and fair picture of the medal, which, if any deficiency should appear, may easily be repaired with a hair pencil or pen, dipped in the colour made use of.

If a relievo only be desired, nothing is necessary but to take a piece of white card, or pasteboard, well soaked in water, then placing it on the wax mould without any colouring, and letting it remain in the press for a few minutes, a good figure will be obtained.

Red seems the best colouring, and therefore black wax is directed to be used; but if the pictures are chosen in black and white, to resemble copper-plates, the wax should be red, for the wax and paint ought to be of different colours, in order to distinguish when the colour is laid on properly, or rightly cleared away.

117. *The method of taking off Impressions from Medals, with Isinglass.*

IMPRESSIONS from medals, having the same effect as casts, may be made also of isinglass glue by the following means. Melt the isinglass, beaten as when commonly used, in an earthen pipkin, with the addition of as much water as will cover it, stirring it gently till the whole be dissolved, then, with a brush of camel's hair, cover the medal, which should be previously well cleansed and warmed, and then laid horizontally on a board or table, greased in the part around the medal. Let them rest afterwards till the glue be properly hardened, and then with a pin raise the edge of it, and separate it carefully from the medal; the cast will be thus formed by the glue as hard as horn, and so light that a thousand will scarcely weigh an ounce. In order to render the relief of the medal more apparent, a small quantity of carmine may be mixed with the melted isinglass, or the medal may be previously coated with leaf gold, by breathing on it, and then laying it on the leaf gold, which will, by that means, adhere to it; but the use of the leaf gold is apt to impair a little the sharpness of the impression.

118. *To preserve Leaves on Paper, with their original appearance, a considerable time.*

LEAVES, or also the petals, or flower leaves of plants, may themselves be preserved on paper, with their original appearance, for a considerable length of time, by the following means.

Take a piece of paper, and rub it over with the isinglass glue, treated as above directed for taking impressions from medals, and then lay the leaves in a proper position on the paper. The glue laid on the paper being set, brush over the leaves with more of the same, and that being dry likewise, the operation will be finished, and the leaves so secured from the air and moisture, that they will retain their figure and colour much longer than by any other treatment.

Butterflies, or other small animals of a flat figure, may also be preserved in the same manner.

119. *To take off the Inscriptions from Brass Plates, in Churches.*

TAKE a little printers' ink, or lamp black and oil, pretty thick, in a phial bottle, then with a sponge rub some of it amongst the letters, then wipe the surface clean, and lay a damp sheet of paper over it, and over that again lay a piece of flannel cloth or baize; then roll a glass bottle or any roller over it, to sink the paper into the engravings, which will fetch out the ink on your paper reversed, but by turning it to the light, it will appear right, or by putting a clean sheet of paper over it, whilst green, rub it and it will stand right.

Another way. Take paper, after your plate is well cleaned, and cover over the inscription, then rub it all over with black lead, and the inscription will appear in white letters.

120. *To make Japanese Cement, or Rice Glue, which may be formed into Busts, Statues, Basso Relievos, &c.*

THIS elegant cement is made by mixing rice flour intimately with cold water, and then gently boiling it. It is beautifully white, and dries almost transparent. Papers pasted together by means of this cement, will sooner separate in their own substance than at the joining, which makes it extremely useful in the preparation of curious paper articles, as tea trays, ladies' dressing boxes, and other articles which require layers of paper to be cemented together. It is in every respect preferable to common paste, made with wheat flour, for almost every purpose to which that article is usually applied. It answers well, in particular, for pasting into books the copies of writings taken off by copying machines, on unsized silver paper.

With this composition, made with a comparatively small quantity of water, that it may have a consistence similar to plastic clay, models, busts, statues, basso relievos, and the like, may be formed. When dry, the articles made of it are susceptible of a high polish; they are also very durable.

The Japanese make quadrille fish of this substance, which so nearly resemble those made of mother of pearl, that the officers of our East Indiamen are often imposed upon.

121. *Method of making Sulphur after it is melted, to remain as soft as Wax, and yield to any Impression from Engraven Stones, Medals, Coins, &c.*

ON melting sulphur in a continued heat, till it grows tough and assumes a red brown colour, then pouring the liquid mass into warm water, it will remain as soft as wax, and yield to any impression from engraven stones, medals or coins. After becoming cold, however, it recovers its former hardness and colour.

122. *To preserve Insects and other small Animals in their natural Shape and Colour, in a substance in imitation of Amber.*

COULD amber be dissolved without impairing its transparency, the art of embalming might poſſibly be carried to a great height by it, if we could preserve the human corpse in a transparent case of amber, as the bodies of flies, spiders, grasshoppers, &c. are, to a great perfection. Something of a substitute of this kind we have in fine resin, which being dissolved by heat, and the bodies of small animals several times dipped in it, they are thus coated with colophony, that in some degree resembles amber; but this must be kept from dust.

123. *To make a Composition for Ornaments.*

TAKE pounded chalk, what quantity you please, add thereto as much thin glue as will make it into paste, which mix well together; then put it into moulds, being a little oiled, and press it well in, after which take it out, and it will grow as hard as stone.

You must make no more of the composition than you want for present use, for if it be left till it grows hard it cannot be worked again.

124. *Method of inlaying Scagliola or Plaster in and upon Marble and Metals, to imitate Flowers, Trees, Fruit, Birds, Beasts, Landscapes, and all sorts of Ornament.*

FIRST procure statuary marble or metal, which must be finely polished. Secondly, take size water, and mix the same with common whiting, brush the same all over the polished marble or metal, when the same is dry, draw the design thereon, and cause that part within which is meant to be inlaid, to be cut out a quarter of an inch deep. Thirdly, take the scagliola or plaster, which must be finely sifted, and have all the necessary colours finely ground, which must be such as are used in oil by the painters, mix the scagliola or plaster into a paste with size water, add to the same such colours as the design requires, then with a small trowel lay the same into the cavities that are intended to be filled up, and let the same remain until it becomes dry and hard, after which level the same to the face of the marble or metal with a small plane or knife, which must be very sharp; care must be taken that the corners of the plane or knife do not take off the polish of the marble or metal. Then take cuttle bone and water, and grind the same more level than the plane or knife may have left it; after washing the same well, take scagliola or plaster mixed with the same size water and colours, but more liquid, Then lay the same over the washed parts with a trowel, so as to stop those pores which may be perceived.

Let this remain until the same comes to be dry and hard, and then again with cuttle bone and water grind that stopping off, so that none remain but in the pores.—Fourthly, let the work dry for six days, then paint the same over with olive oil, but great care must be taken not to oil the marble or metal. When the same is dry take tripoli, ground into a fine powder, and with a piece of soft leather, rub over the work until the same has obtained a fine polish.

Fifthly, the ground of the marble or metal must be made rough for the scagliola or plaster to stick the better upon it. Lastly, in order to lay scagliola on metal without the metal appearing on the surface, the scagliola must be laid on mixed with such colours as are intended to be the ground, the same to be levelled as above, then stop the ground, and draw the design upon it. The rest of the proceeding as above described.

125. *How to take Impressions from Medals, &c. in Plaster of Paris.*

AFTER having oiled the surface of your mould gently, with a little cotton or a camel hair pencil in oil of olives, put a hoop of paper round it exactly to the thickness you would chuse your impression to be made, then take some prepared plaster of Paris in a tea-cup or basin, according to the quantity wanted to be at that time used, and some fair water, to the consistence of a very thick cream, and with a brush rub over the surface of the mould, and immediately afterwards, make it to a sufficient thickness, for rubbing the surface entirely prevents any air holes from appearing on the impression. Let it stand about half an hour, and it will in that time grow so hard that you may very safely take it off; then pare it smooth on the back, and neatly round the edges, and it is done. It should be dried, if in cold or damp weather, before a brisk fire.

In this operation, when you have made the impressions to a proper thickness, you should, while they are wet in the moulds, sprinkle them with some of the powder, which makes them considerably harder, and dry sooner.

If you cover the face of the mould with fine plaster, a coarser sort will do to fill it up with, and be a considerable saving; but I would also advise you not to mix more plaster at one time than what you immediately want, because it will be apt to thicken too soon, and so the superfluous quantity will be lost, (until it be burnt again, and go through the same operations as when at first prepared) for adding water to it, to thin it, will quite prevent it from ever setting hard a second time, without burning it afresh.

Plaster of Paris may be tinged with several colours when you are casting, by mixing it with Prussian blue, red lead, or yellow ochre, with which you may compose a blue, red, yellow and green, and it has a very good effect when the raised part is white, red, &c. and the ground of another colour. But it is to be observed that the coloured impressions take a longer time in becoming hard than when the plaster is unmixed. But if you sift some plaster upon the top of your cast (when it happens to be a flat figure) it will set the sooner, and the superfluous part may be pared off when thoroughly dried.

126. *To prepare a Plaster Mould so as to take a Brimstone or Wax Impression from it.*

LET your plaster mould be quite dry, then dip it in the following mixture; viz.

Take half a pint of boiled linseed oil, and spirit of turpentine one ounce, mix them together in a bottle, when wanted pour the mixture into a plate or saucer, and dip the surface of your mould into it; take your mould out again, and when it has soaked up the oil, dip it again, repeat this till the oil begins to stagnate upon it, then take a little cotton wool hard rolled up, (to prevent the oil from sticking to it) and wipe it carefully off, lay it in a dry place for a day or two, (if longer the better) and the mould will acquire a very hard surface from the effect of the oil. When used it must be oiled with oil of olives, in the same manner as before directed.

127. *How to cast Brimstone, and give it a Metallic Gloss.*

TAKE some stone brimstone, melt it in an iron ladle over the fire, let it flame about five or six minutes, then take it off, and with a piece of board extinguish the flame, and let it cool a little, so as not to feel like glue, or run ropy; it is then proper for use, and you may pour it into your mould, in which let it stand five or six minutes, and you may take it off, pare it as before, and rub the surface of the impression over with some cotton and the best powder of black lead, which will give it a fine metallic gloss.

128. *To make Sulphur red or green, and cast it in Moulds, like Marble.*

TAKE two ounces of best clean stone brimstone, and melt it slowly over a gentle fire, without letting it flame, when it is melted add an ounce of vermillion, stir them well together, then pour the composition over the surface of your mould, and immediately pour it off again, and fill the mould up to a proper thickness with common brimstone, let it stand the same time as before-mentioned, then pare it and rub over the surface with some clean cotton, which will give it a polish. The more impressions you can make at once melting the better, because the brightness of the red fades the oftener it is melted; it may be made green by using it in the same manner, and by adding the same quantity of the best smalt, instead of vermillion, only it requires more stirring to mix it properly; it may also be made to imitate a beautiful marble, by mixing several colours separately, and made in small squares of equal sizes, which break into exact lengths, and dispose them according to your fancy endwise, in an iron frame that will open with a joint, after which melt them together, and the colours will unite in a pleasing manner, and each will appear distinct; when you melt it be careful not to shake it, and let it cool by degrees.

129. *To cast Convex or Concave Moulds of Medals, on Tinfoil, with Plaster of Paris.*

TAKE a medal, &c. and cover it with very thin tinfoil, which press as close to the medal as you can, go over every part with a brush, laying on tolerably hard, in order to press the tinfoil into every cavity of the medal, after which you may pour prepared plaster upon it, and when it is hard take the medal out, leaving the tinfoil in the plaster; then with a little fine olive oil anoint the tinfoil, and the plaster where it must part, and pour more plaster upon the tinfoil, which also let harden; you may then separate them, and take out the tinfoil, and you will have both a convex and concave mould.

130. *To lay Paper Prints on the inside of Glass Globes.*

FIRST cut off all the white part of your impression, so that nothing appears but the print, then prepare some strong gum arabic water or size, with which you must brush over the face side, after which put it into the globe, and with a long small stick, on which a camel hair pencil is fixed, stick it even on, and by this method you may put what quantity of prints you like into the globe; let them dry about twelve hours, then pour some prepared plaster of Paris, either white or tinged, whatever colour you please, and turn the globe easily about, so that every part be covered, then pour out the superfluous plaster, and it is finished.

131. *Method of taking a Cast in Plaster from a Person's Face.*

THE person whose likeness is required in plaster, must lie on his back, and the hair must be tied back, so that none of it covers the face; into each nostril convey a conical piece of stiff paper, open at both ends, to allow of breathing. The face is then lightly oiled over in every part with sallad oil, to prevent the plaster from sticking to the skin; procure some fresh burnt plaster, and mix it with water to a proper consistence for pouring, then pour it by spoonfuls quickly all over the face (taking care the eyes are shut) till it is entirely covered to the thickness of a quarter of an inch. This substance will grow sensibly hot, and in a few minutes will be hard. This being taken off, will form a mould, in which a head of clay may be moulded, and therein the eyes may be opened, and such other additions and corrections may be made as are necessary. Then, this second face being anointed with oil, a second mould of plaster must be made upon it, consisting of two parts joined lengthwise along the ridge of the nose, and in this a cast in plaster may be taken, which will be exactly like the original.

132. *To Silver Looking Glasses.*

IN order to go completely forward, you must be prepared with the following articles, viz.

First, a square marble slab, or smooth stone well polished, and ground exceeding true, the larger the better, with a frame round it, or a groove cut in its edges, to keep the superfluous mercury from running off. Secondly, lead weights covered with cloth, to keep them from scratching the glass, from one pound weight to twelve pounds each, according to the size of the glass which is laid down. Thirdly, rolls of tinfoil. Fourthly, mercury or quicksilver, with which you must be well provided, then proceed as follows.

Cut the tinfoil a little larger than the glass every way, and lay it flat upon the stone, and with a straight piece of hard wood, about three inches long, stroke it every way, that there be no creases or wrinkles in it, then drop a little mercury upon it, and with a piece of cotton wool, or hare's foot, spread it all over the foil, so that every part may be touched with the mercury. Then, keeping the marble slab nearly horizontal, pour on the mercury all over the foil, cover it with a fine paper, and place upon it two weights very near its lowest end or side, to keep the glass steady, while you draw the paper from between the silvered foil and the glass, which must be laid upon the paper; as you draw the paper, you must take care that no air bubbles be left, for they will always appear if left in at the first; you must likewise be sure to make the glass as clean as possible on the side intended to be silvered, and have the paper also quite clean, otherwise, when you have drawn the paper from under it, dull white streaks will appear, which are very disagreeable.

After the paper is drawn out, place as many weights upon the glass as you conveniently can, in order to press out the superfluous mercury, and make the foil adhere to the glass. When it has lain six or seven hours in this situation, raise the stone about two or three inches at its highest end, that as much of the mercury may run off as possible; let it remain two days before you venture to take it up, but before you take the weights off, gently brush the edges of the glass, that no mercury may adhere to them, then take it up and directly turn it over, with its faceside downward, but raise it by degrees, that the mercury may not drip off too suddenly, for if, when taken up, it is immediately set perpendicular, air will get in between the foil and the glass at the top, as the mercury descends to the bottom, by which means, if you be not exceedingly careful, your labour will be lost.

Another method is to slide the glass over the foil, without the assistance of paper.

133. *To Silver Concave Mirrors.*

TAKE an earthen plate, on which pour some prepared plaster of Paris, mixed with water to a proper consistence, then immediately before it grows too stiff, lay the meniscus with its convex side downward in the middle of the plate, and press it until it lies quite close to the plaster, in which situation let it remain until the plaster becomes quite dry, after which, work a groove with your finger round the outside of the meniscus, in order to let the superfluous mercury rest upon it, then cut the tinfoil to a proper size, and press it with the meniscus into the plaster mould, in order to make it lie close, after which cover it with the mercury, and, without a paper, (as directed for silvering plain mirrors) slide it over the silvered foil, then place a weight on it, and let it stand two or three days, raising it by degrees, that the mercury may drip off gradually.

134. *Method of making Glass Globes look like Derbyshire Spar or Marble.*

MAKE a strong solution of isinglass in common water by boiling, pour a quantity of this while warm into your globe, shake it thoroughly about, that all the sides may be wetted, and then pour out the rest of the mixture. Immediately after this throw in red lead, shake it, and turn it about, throw it into many places with a tube, and the moisture will make it stick, and run in waves and pretty figures. Then throw in some of the painter's blue smalt, and make it run in waves in the globe as the red lead, then do the same with verdegrease, next with orpiment, then with red lake, and any other colours you think proper, all well ground, always casting in the colours in different places, and turning the globe, that the mixture within may run them into the waves. Then take fine plaster of Paris, and put a quantity of it into the globe, shake it also quickly about, this will every where stick firmly to the glass, and give it a strong inner coat, keeping all the colours on very firmly and strong.

135. *Method of painting Mezzotinto Prints, in imitation of Oil Paintings.*

TAKE a mezzotinto print, and laying it on a very smooth board, with the face of the print downward, wet it well with a sponge, that it may swell to its full extent, then having two straining frames ready, one the exact size of the print, the other to go round, allowing about a quarter of an inch between the two, place the last-mentioned on the print thus soaked, with some strong paste round the margin of the print, that it may stick to the strainer, let it lay on the table till dry, and the print will be strained very tight, then varnish the print on the back once, twice, or more, till it is transparent, when it is dry it is fit to paint, which is done on the back of the print, in the following manner, place it over a piece of white paper, or in any form to receive the light on the front, and with what different colours you chuse, be careful to paint within their proper limits, the shading in the print forms both the drawing and painting, without the trouble of mixing the colours to their different degrees of light; when it is all painted, and quite dry, take the smallest strainer, (mentioned before) the size of the print, which is made to go within the other, with a piece of primed canvas nailed thereon, and pasting the back of the print which you have painted, lay the strainer on, when it is again quite dry, cut round the space between the two strainers, and you will have a handsome painting, to appearance painted on the canvas.

136. *A method of printing Mezzotinto Prints in Colours.*

A copper-plate with an etched or engraved outline, dotted next the lights and filled in with mezzotinto ground, is printed in colours after nature, or from a picture, by the following process.

The plate being warmed in the usual manner, the colours are applied by means of stump camel hair pencils, to the different parts, as the subject suggests; it is then wiped with a coarse gauze canvas, any other being improper. After this it is wiped clean with the hand, as in common practice, and being again warmed is passed through the press.

The colours are mixed with burnt linseed oil, and these generally used by painters, are proper.

137. *To make Le Blond's Varnish for coloured Prints.*

THE following is the receipt for the varnish which Le Blond used on the coloured prints, executed by him in this country, before he went to France.

Take four parts of balsam of capivi and one of copal, powder and sift the copal, and throw it by degrees into the balsam of capivi, stirring it well each time it is put in; I say each time, for the powdered copal must be put in by degrees, day after day, in at least fifteen different parts. The vessel must be close stopped, and exposed to the heat of the sun, or a similar degree of heat, during the whole time, and when the whole is reduced uniformly to the consistence of honey, add a quantity of warm turpentine. Chio turpentine is the best.

Le Blond's prints were long neglected, and are now forgotten. Whatever difference of opinion may prevail respecting them, there can be none respecting his varnish, as some of these prints have been seen in perfect condition, notwithstanding they had been thrown carelessly about for nearly sixty years.

138. *Method of taking Paintings from the Old Canvas, and transferring them to New.*

THE works of the greatest masters are often in danger of being lost by the decay of the canvas upon which they are drawn. A method of remedying this inconvenience, therefore, cannot but be gratifying to all true lovers of painting.

Let the decayed picture be well cleaned, and spread with its face downwards upon a smooth table; the back of it is then to be well moistened with boiling water, and when the canvas is sufficiently softened, the picture must be turned up, well stretched out, and nailed down to the table all round the edges. The painting is then to be covered over with strong glue, very hot, and a linen cloth, half worn, of the same size as the picture, to be spread upon it, and nailed down round the border: it is then to be exposed to the sun, to be dried as soon as possible. When dry, it is to be detached from the table, and nailed down again with the back of the painting uppermost. A little raised border of wax is made all round the edges, and the table being placed exactly level, a mixture of aqua fortis and water is to be poured upon it. But as this mixture, if too strong, will burn the painting, care must be taken to prevent this, by dipping your finger in the mixture before you use it; and if your finger does not turn yellow immediately, it is a sign that the liquors are mixed in a due proportion. This mixture remains upon the canvas till the texture is quite dissolved, and the threads rotted; the liquor is then poured off, and the threads of the canvas are easily taken off with a spatula, and the crust of painting will remain alone, glued with its face downwards to the linen cloth before-mentioned. The crust is then to be washed and cleaned with pure water, afterwards wiped with a fine soft sponge, and permitted to stand till it be quite dry.

It is then to be covered with glue, wherein a little brandy is to be mixed, to make it stronger, upon this glue a new canvas is immediately superinduced, spread smooth, and well pressed, so that it may stick in every part. The best way of pressing it, is with plates of lead, or slabs of polished marble, care being taken to wipe the new canvas from time to time, to prevent its sticking to the plates, by means of the glue which oozes through it; all that now remains to be done is, to take away the linen cloth and glue which cover the face of the painting. As soon, therefore, as the last glueing is dry, the whole is to be detached from the table, and the linen cloth turned up, by moistening it with the mixture of aqua fortis and common water, its texture will soon be destroyed, and it may be taken away, and then the glue may be easily moved by means of hot water. Thus is the painting transferred, entire and perfect, to a new canvas.

When paintings are upon wood, the wood must be pared till it be very thin, and the mixture of aqua fortis and common water being poured upon what remains, will soon dissolve its texture, as in the former case, and render it easy to be taken away.

139. *Method of Painting, Spangling, Gilding, and Silvering Glass, and thereby Ornamenting Carriages, Sedan Chairs, Buildings, Furniture, Musical Instruments, &c.*

THE painting must be performed on the back of the crystal or glass, so as when finished to appear on the front, the colours prepared in oil or varnish as in other work. The parts of ornament which are gold, must be first shadowed on the glass, and when quite dry the gold leaf must be laid on. Silver ornament must be done in the same manner. For the spangling leave the parts to be spangled till the last, then shadow them, and when dry varnish the parts with glutinous copal varnish, and strew the spangles on while it is wet, when the spangles are quite dry varnish them two or three times. If the spangling is to be white use silver spangles; if yellow, use gold spangles; if blue, glaze the parts to be spangled with fine Prussian blue, ground very fine in oil or varnish, and lay on silver spangles; if green, glaze the parts with transparent green.; if crimson, use the best fine lake; if purple, use a mixture of Prussian blue and fine lake. To make the painting appear more raised, paint the ornaments, and leave the ground of the crystal or glass quite clear, and put another plate of glass coloured behind (about an inch or more, according to the size) the glass painted on.

140. *Method of Preparing and Printing Paper in different Patterns, and Silvering it over with fine Silver Leaves, so as to resemble Damask Lace and various Silk Stuffs, to be used for Hangings and other Furniture for Rooms.*

WHEN the paper is coloured in the ordinary course, size it properly with a size of isinglass, parchment, or common size, so as to bear an oil or a varnish gold size. This being dry, lay with a printing block, or a brush, on those parts where the ornaments are intended to appear, gold size or any of the other compositions that will answer the same purpose; when the gold size or composition is nearly dry, lay on real fine silver leaves, and then size the paper well two or three times, and when dry, varnish it over with any of the various sorts of varnish which will resist damp.

141. *Method of preparing Oil Colours in Cakes, which, when rubbed down in Oil, work as well as other Oil Colours.*

TAKE of the clearest gum mastic reduced to fine powder four ounces, of spirits of turpentine one pint, mix them together in a bottle, stirring them frequently till the mastic is dissolved, if it is wanted in haste some heat may be applied, but the solution is best when made cold. Let the colours to be made use of be the best that can be procured, taking care that by washing, &c. they are brought to the greatest degree of fineness possible. When the colours are dry, grind them on a hard close stone (porphyry is the best) in spirits of turpentine, adding a small quantity of the mastic varnish. Let the colours so ground become again dry, then prepare the composition for forming them into cakes in the following manner.

Procure some of the purest and whitest spermaceti you can obtain, melt it over a gentle fire in a clean earthen vessel, when fluid add to it one-third of its weight of pure poppy oil, and stir the whole well together; these things being in readiness, place the stone on which your colours were ground on a frame or support, and by means of a charcoal fire under it make the stone warm, next grind your colour fine with a muller, then adding a sufficient quantity of the mixture of poppy oil and spermaceti, work the whole well together with a muller to a proper consistence, take then a piece of a fit size for the cake you intend to make, roll it into a ball, put it into your mould, press it, and it will be complete.

When these cakes are to be used they must be rubbed down in poppy or other oil, or in a mixture of spirit of turpentine and oil, as may best suit the convenience or intention of the artist.

142. *Method of beautifying and preserving the Native Colour of all sorts of Wood, particularly Mahogany, or Furniture made thereof, in a very superior manner to any hitherto practised, by means of a stain Varnish and Powder, which Powder will also be extremely useful in polishing and sharpening all fine Steel-edged Instruments.*

TAKE pumice stone and burnt alum, of each equal parts, finely powdered, true lapis calaminaris, tile, and green vitriol calcined to redness, of each half a part, finely powdered, mix them into a powder, and rub the wood with it with a woollen cloth until it receives a good polish.

(They must be finely levigated for edge tools.)

Then use the following stain. Take six pounds of stick lac, boil it in three gallons of water till the colour is extracted, and strain off the liquor, then add to it half a pound of madder root, boil it till it is reduced to three quarts, take half a pound of cochineal, half a pound of kermes berries, and four ounces of clean scarlet rags, digest them in a glass vessel with one gallon of spirit of wine, and two ounces of pearl ash dissolved in half a pint of water, till all the colour is extracted, strain and add the decoction of stick lac to it. Lastly, add as much aqua fortis as will bring it to a proper red colour, with which brush over the wood till it becomes of a proper colour.

The varnish.—Take a pound of clear white amber, and half a pound of gum copal, put them into a close vessel with six pounds of oil of nuts, half a pound of spirits of turpentine, of oil of rosemary and lavendar each half a pound, digest them in a sand heat till the oils become as thick as syrup, strain for use when clear, varnish the wood with a brush, and let it dry.

143. *Simple method of cleaning Paintings.*

LET the picture be first taken out of the frame, then covered with a clean napkin, which should be moistened with pure water, and suffered to remain in that state for a fortnight, or longer, according to circumstances. During this period, the cloth should be occasionally wetted, till it has loosened or softened all the adventitious particles on the surface.

A small quantity of purified linseed oil is now to be passed over the picture, which will thus, in most instances, resume its former lustre.

144. *Best method of Gilding Glasses on the Edges.*

FINE transparent amber reduced to powder is boiled in a brass vessel, having a valve in its cover, with as much drying oil as will just cover it.—Generally in five or six hours the amber is perfectly dissolved. Dilute the solution with four or five times its quantity of oil of turpentine, and let it stand some days, that all the impurities may settle to the bottom. That the varnish may dry the easier and acquire the more firmness, it is to be ground with a little white lead, or rather with a mixture of white lead and minium. It is to be applied very thin on the glass, and the gold leaf rather blown upon the part, so as it may stick fast, than pressed down with cotton. The glasses may be laid in a warm place, free from dust, till the varnish is fully hardened, after which the gold may be burnished, a piece of smooth paper being laid between the tooth or steel burnisher and the gold.

This gilding is durable and of a fine lustre, and as the toughest varnishes naturally deserve the preference, the amber varnish here described promises in virtue of that quality to be the best.

145. *To lay Gold upon White Earthenware.*

PROCURE some japanner's gold size, and with it draw your design upon the vessel to be gilt, moistening the gold size, as you find necessary, with oil of turpentine, set your work in a clean place to dry for about an hour, and then place it so near the fire that you can but just bear the heat of it with your hand for a few seconds. Let it remain there till it feels quite tacky or clammy, then, having procured a cushion and some leaf gold, cut it into slips of the proper size, and lay it on with a little cotton wool. When the gold is all on, put the ware into an oven to be baked for two or three hours.

146. *Method of Gilding Glass with Burnished Gold.*

GILDING on glass is chiefly used for ornamenting the borders of prints, name plates, and for other ornamental decorations of various kinds, and is performed in the following manner.

Dissolve some of the whitest and most transparent isinglass in the clearest water, till pretty thick, strain it through a linen cloth, and keep it in a vial well corked, then take the best black varnish, such as is used for the roofs of carriages, to which add a small quantity of burnt lamp black, well ground in spirits of turpentine, and with a large flat varnish brush give the glass one even thin coat, possessing a small degree of transparency, and appearing a good black on the other side of the glass, then with a fine needle describe the outline of what black is to come out, then with a camel hair pencil lay a little water on the parts of the varnish you wish to detach, and in a few minutes it will peel away clean from the glass; when all the varnish to be taken off is removed, set the glass near the fire to dry and harden the varnish, then take the size of a pea of the isinglass jelly, and put it into a tea-cup containing some clean hot water, in which it must be dissolved; next prepare your gold leaf, by cutting it on a gilding cushion, into the most convenient forms, with a hair pencil, dipped into the isinglass water, touch those parts of the glass you would have gilt, and while moist lay on the gold leaf, then set the glass in a slanting position before the fire to dry a few minutes, and while it is a little warm, with a piece of clean cotton, rub the gold smartly to the glass, which will give it a kind of polish, then proceed to lay on a second coat of gold in the same manner, and afterwards lay a coat of the varnish over your gold, and your work is finished. Some lay on three coats of the gold, but if the gold leaf be good, two are generally sufficient.

147. *A Varnish for Prints, Drawings, Fancy Work, &c. &c.*

TAKE four ounces of isinglass in small pieces, boil it in one quart of brandy or spirits of wine, expose it to the air, and when only warm wash over the print or drawing, (which should be previously mounted) and let it stand till quite dry, then wash it again at a small distance from the fire, or it will blister, which repeat two or three times, then go twice over with the following white varnish. Take of gum sandarach and gum mastic equal parts, dissolve them in spirits of wine, let them settle two days, then strain through a linen cloth, and pour the clear liquor into a bottle for use.

148. *A Varnish for Toilet Boxes, Cases, Fans, &c.*

DISSOLVE two ounces of gum mastic, and eight ounces of gum sandarach, in a quart of alkohol, then add four ounces of Venice turpentine.

149. *A Varnish for Wainscot, Cane Chairs, &c.*

DISSOLVE in a quart of alkohol, eight ounces of gum sandarach, two ounces of seed lac, and four ounces of rosin, then add six ounces of Venice turpentine. If the varnish is wished to produce a red colour, more of the lac and less of sandarach should be used, and a little dragon's blood should be added. This varnish is so thick that two layers of it are equal to four or five of another.

150. *A Varnish for Violins and other Musical Instruments.*

PUT four ounces of gum sandarach, two ounces of lac, two ounces of gum mastic, an ounce of gum elemi, into a quart of alkohol, and hang them over a slow fire till they are dissolved, then add two ounces of turpentine.

151. *Varnish in order to employ Vermilion for Painting Equipages.*

DISSOLVE in a quart of alkohol six ounces of sandarach, three ounces of gum lac, and four ounces of rosin, afterwards add six ounces of the cheapest kind of turpentine, mix with it a proper quantity of vermilion when it is to be used.

152. *A Varnish to prevent the Rays of the Sun from passing through the Panes of Window Glasses.*

POUND gum adragant into powder, and put it to dissolve for twenty-four hours in whites of eggs well beaten. Lay a coat of this on the panes of your windows with a soft brush, and let it dry.

153. *To make Seed Lac Varnish.*

TAKE spirits of wine one quart, put it in a wide mouthed bottle, and add thereto eight ounces of seed lac, which is large grained, bright, and clear, free from dirt and sticks, let it stand two days or longer, in a warm place, often shaking it, strain it through a flannel into another bottle, and it is fit for use.

154. *To make Shell Lac Varnish.*

TAKE good spirits of wine one quart, eight ounces of the thinnest and most transparent shell lac, which, if melted in the flame of a candle, will draw out in the longest and finest hair, mix and shake these together, and let them stand in a warm place for two days, and it is ready for use. This varnish is softer than that which is made of seed lac, therefore is not so useful, but may be mixed with it for varnishing wood, &c.

155. *To imitate Porphyry on Glass.*

TAKE red ochre and lake, grind them in a solution of gum tragacanth, then sprinkle, with a brush or feather, the glass all over with that colour; when dry take brown red, or if that is too red, add some umber, or soot to it; mix it up with the gum tragacanth to the consistence of a paste, and lay it on the glass, over the sprinkled colours, as thick as you please, then let it dry. If you proceed after the same manner on a polished marble, or any other stone that is flat and smooth, and lay a thick coat of the brown red on the spots of lake, letting it dry in the shade and then polish it, you will have a beautiful imitation of porphyry, without the glass. Observe to anoint the stone first with a little oil, before you sprinkle your lake, so as to make it come off easy when the work is done.

156. *A method of making Pictures of Birds, by means of their own Feathers.*

GET a thin board, or pannel, of deal or wainscot, well seasoned, that it may not warp; paste white paper over it, and let it dry. Get any bird that you would wish to represent, and draw its outline on the paper in the attitude you desire, and of the full size, adding what landscape, back ground, &c. you wish. This outline, so drawn, is afterwards to be filled up with the feathers from the bird, placing each feather in that part of the drawing corresponding to the part of the bird it was taken from.

To do this, cover the representation with several coats of strong gum water, letting it dry between each coat till it is of the thickness of a shilling. When your ground is thus prepared, take the feathers off from the bird, beginning at the tail or points of the wings, as you must work upwards towards the head. These feathers must be prepared by cutting off all the downy part, and the larger feathers must have the insides of their shafts pared off, to make them lie flat. To lay them on, make use of a pair of small pliers to hold them by, and moistening the gummed ground with water, place each feather in its natural and proper situation. Keep each feather down by putting a small leaden weight upon it, till you have another prepared to lay on. You must be careful not to let the gum come through the feathers, as it smears them, and sticking to the bottoms of the weights, will be apt to pull the feathers off. When you have put on all the feathers, you must cut a piece of round paper, and colour it like the eye, which you may stick in its place, but the best way is to get small eyes made of glass. The bill, legs, and feet must be drawn and coloured from nature. When it is finished and adjusted to your mind, lay a sheet of paper upon it, and upon that a heavy weight to press it, which must remain till the whole is quite dry.

157. *To preserve Birds with their natural Plumage unhurt.*

LET a bird, beast, or any such like production of nature be procured, that has been well preserved in its death, either naturally or by shot, as those that intend making any tolerable collection must do, I would not recommend shooting them (birds in particular) with shot smaller than common partridge shot, or No. 5, and that at a considerable distance, to prevent their being torn with too great a number.

Having procured a bird as aforeſaid, let it be opened from the upper part of the breast to the vent, with a sharp knife, or pair of scissors, the feathers of the breast and belly being first carefully laid aside by the fingers, so as not to hinder the skin being easily come at. The skin must then be carefully loosened from all the fleshy parts of the breast, body, thighs, and wings; then cut off all the flesh from those parts, and take out also the entrails and all the inside; then, having got a composition of burnt alum, camphire, and cinnamon, of each an equal quantity, well powdered and mixed together. Strew some of this powder lightly over the whole carcase, but salt is by no means to be used with this composition, as it will always drop and soil the plumage in moist weather. Pour also into the body a small quantity of camphire, dissolved in rectified spirits of wine. After that, fill up the cavity with fine cotton, or any soft woolly substance, pouring some of the aforesaid spirits into the cotton, or stuffing; open next the mouth, and with a pair of scissors take away the tongue, the roof of the mouth, eyes, brains and inside of the head; fill that also with the same composition, and having procured eyes as near the natural ones as possible, put them into the sockets by means of a small pair of nippers, introduced at the mouth. The eyes will be best made by dropping drops of black sealing wax on a card, of the size of the natural ones; the card must be cut something larger than the wax, to prevent their falling out of the head. Fill the head quite full with cotton, pouring some of the spirits down the throat, with some of the powder; a small piece of brass wire, that has been heated in the fire to make it pliable, may be put down the throat, being passed through one of the nostrils, and fastened to the breast bone, to place the head in any attitude you chuse; next fill up the body, where the flesh has been taken away, with cotton and your composition, and, having a fine needle and silk, sew up the skin, beginning at the breast, observing as you approach towards the vent, to stuff the skin as tight as it will bear. This will be easiest accomplished by means of a small piece of stick, or ivory, like a skewer, till the whole is done: then lay your feathers of the breast and belly in their proper order, and your bird will be compleated. If you would chuse to put it into attitude, by introducing a small piece of the wire above-mentioned, through the sole of each foot up the leg, and into the pinion of each wing, it may be disposed of as you please.

A composition of sublimate mercury, tempered with some water, and rubbed gently over the feathers, will prevent insects and other vermin from destroying the plumage.

158. *To make artificial Eyes for dryed or stuffed Birds.*

TAKE two small pins, heat the heads, to which put as much black wax as you think proper for the bigness of the eye; place the pins thus furnished with the wax before the candle, and make the wax in a globular form by turning the pins about their axis. The heat of the candle will give them a bright polish, if you take care not to touch them till cold. Red eyes, with black pupils, may be made thus:—apply red wax to the pins as before, only make a small cavity in the top: when it is cold fill the cavity with black wax, and polish it with the heat of the candle as before, taking care not to melt the red wax, and thereby confuse the colours. White eyes, with black pupils, may be made thus: put pins through the holes of beads, (such as are commonly used for necklaces) heat the heads, apply the black wax, and polish it as before. Variety of eyes may be made with beads of various colours.

169. *A new method of preserving Butterflies and Moths.*

THIS method consists in fixing the plumage of the wings on paper, so as to shew both their upper and under sides, without injuring the colour.

The cement made use of is prepared in the following manner. To a thick, clear, and colourless solution of gum arabic, in cold distilled water, add a little alum and common salt, to take off its lustre when dry. This fluid, when thinly spread on stiff writing paper, is capable of detaching with great ease, and fixing without injury, the plumage of the wings of butterflies that are applied to it; these, however, ought to be fresh, in order to succeed completely. The mode of operating is to double a half sheet of stiff paper, and on one side of the fold to cover with the cement, by means of a short camel hair brush, a space equal to the size of the butterfly. The insect is to be killed without spoiling its wings, which contrive to spread out as regularly as possible, in a flying position, and gently laid on the cement with a pair of nippers; then cut off the body close to the wings, and on the corresponding part of the other fold, an equal space is to be covered with the cement. The paper being now doubled, and gently pressed with the palm of the hand, is to be laid in a few sheets of soft paper, and subjected, for a few minutes, to the moderate action of a common press; open the paper carefully, and take off, with the point of a pen-knife, the membranous part of the wings, and on the opposite sides of the paper will be found the upper and under surface of the wings, in all their brilliancy. The feet and body should be represented by an accurate copy of the original, and then the insect is complete, and may be preserved in this state many years, without material injury.

160. *To make artificial Coral for Grottos.*

TO two drachms of fine vermilion, add one ounce of clear resin, and melt them together, having your branches or twigs peeled and dried, paint them over with this mixture, while hot, and shape them in imitation of nature. The black thorn is the best branch for it, hold them over a gentle fire, turning them round till they are perfectly covered and smooth. You may make white coral with white lead, and black with lamp black.

161. *To make a Cement for Derbyshire Spar, and other Stones.*

A cement for this purpose may be made with about seven or eight parts of resin, and one of bees wax, melted together, with a small quantity of plaster of Paris. If it is wished to make the cement, fill up the place of any small chips that may have been lost, the quantity of plaster must be increased a little; when the ingredients are well mixed, and the whole is nearly cold, the mass should be well kneaded together. The pieces of spar that are to be joined, must be heated until they will melt the cement, and then pressed together, some of the cement being previously interposed.

Melted sulphur, applied to fragments of stones previously heated (by placing them before a fire) to at least the melting point of sulphur, and then joined with the sulphur between, makes a pretty firm and durable joining.

Little deficiences in the stone, as chips out of corners, &c. may also be filled up with melted sulphur, in which some of the powder of the stone has been mixed: heat the stone first.

162. *Method of making a Cement useful in Filigree Work, &c.*

GUM arabic, dissolved in as small a quantity of water as may be, and diluted to a proper consistence with gin, or any proof spirits, forms a very useful cement for all purposes where gum water is commonly used, the spirit preserving it from becoming putrescent; as the spirit evaporates, more should be added. It should be stirred and mixed together at the time of using.

If plaster of Paris be added to gum water, it makes a cement useful to ladies in filigree work.

163. *A Cement for broken China, Glasses, &c.*

TAKE quick lime and white of eggs, or old thick varnish, grind and temper them well together, and it is ready for use.

Drying oil and white lead are also frequently used for cementing china and earthen ware; but this cement requires a long time to dry. In cases where the vessels in being used, are not required to bear heat or moisture, isinglass glue, with a little tripoli, or chalk, is better.

164. *Method of restoring to use cast iron Furnaces and Soap Pans, that happen through accident or mismanagement to be cracked.*

TAKE a small clod of fine new lime slacked and finely sifted; mix it up with white of eggs well beaten till it is of the consistence of pap or soft mortar, add to it some iron file dust, and with this paste fill up the inside of the crack which will be sufficient, raising a little seam or bead upon it, and it will soon become hard and fit for use.

165. *The method of Moulding Boxes both of Shell and Horn.*

IN the first place form a mould, which must consist of two pieces, viz. of a circle about half an inch thick, which should slope a little, in order to draw out the moulded shell the more easily, and a ring fitted to the outside of the circle, so that both together make the shape of a box. These two pieces being adjusted, it is necessary to round the shell, to be moulded of such a size, that when moulded it will be a little higher than the ring of the mould, that there may be no deficiency. The mould is then to be put into a press on a plate of iron, exactly under the screw of the press; put then the shell upon the circle of the mould, so that its centre also is exactly opposite to the screw of the press; then take a piece of wood, formed into a truncated cone, and not so thick as the diameter of the circle of the mould, nor so deep as the ring, then put a plate of iron above the cone, and screw down the press gently and cautiously till the whole is well fixed, then plunge the whole into a cauldron of boiling water placed above a fire. In eight or ten minutes the shell or horn will begin to soften, screw the press a little firmer, that the wooden cone may sink into the softened shell, repeat this from time to time, till the cone is quite sunk in the mould, then take out the press and plunge it into cold water; when it is cold take the box now formed out of the mould, and put into the inside of it a new mould of tin, exactly of the form you wish the inside of the box to be, do the same with the outside, put it again into the press, and plunge it into boiling water, screw the press gradually till the box be fashioned as you desire.

166. *Method of preparing Green Wood, so that it will not split in the turning.*

HAVING cut your wood into pieces of a proper size, put it into a vessel full of ley made with wood ashes, boil it there about an hour, then, taking the cauldron off the fire, allow the ley to cool, then take out the wood, and dry it in the shade.

167. *Method of giving an Ebony Black to hard and fine Woods.*

AFTER forming the wood into the figure proposed, rub it with aquafortis a little diluted, small threads of wood will rise in the drying, which you will rub off with pumice stone, repeat this process again, and then rub the wood with the following composition. Put into a glazed earthen vessel a pint of strong vinegar, two ounces of fine iron filings, and half a pound of pounded galls, and allow them to infuse for three or four hours on hot cinders, at the end of this time augment the fire, and pour into the vessel four ounces of copperas (sulphat of iron), and a chopin of water, having half an ounce of borax and as much indigo dissolved in it, and make the whole boil till a froth rises, rub several layers of this upon your wood, and when it is dry polish it with leather, on which you have put a little tripoli.

168. *Method of giving to Plum Tree the colour of Brazil Wood.*

SLACK lime with urine, and bedaub the wood over with it while it is hot, allow it to dry, then take off the coat of lime, and rub it with shamoy skin well oiled, or steep your wood in water, having a quantity of alum dissolved in it, then, having allowed brazil wood to dissolve in water five or six hours, steep your wood in it, kept lukewarm during a night, and when it is dry, rub it as before directed with shamoy skin well oiled.

169. *Method of giving a fine Black Colour to Wood.*

STEEP your wood for two or three days in lukewarm water, in which a little alum has been dissolved; then put a handful of logwood, cut small, into a pint of water, and boil it down to less than half a pint. If you then add a little indigo, the colour will be more beautiful; spread a layer of this liquor quite hot on your wood with a pencil, which will give it a violet colour: when it is dry spread on another layer, dry it again, and give it a third: then boil verdigrease, at discretion, in its own vinegar, and spread a layer of it on your wood; when it is dry rub it with a brush, and then with oiled shamoy skin; this gives a fine black, and imitates perfectly the colour of ebony.

170. *Method of cleaning and whitening Bones, before using them.*

HAVING taken off, with a saw, the useless ends of the bones, make a strong ley of ashes and quick-lime, and into a pailful of this ley, put four ounces of alum, and boil the bones in it for an hour; then take the vessel containing the ley off the fire, and let it cool; then take out the bones and dry them in the shade.

171. *Method of soldering Shells.*

CLEAN the two sides of the shells which you wish to join together; then having joined them wrap them up in linen, folded double and well moistened; then heat two plates of iron, pretty hot, that they may keep their heat for sometime, and putting your shells rolled up, between them, under a press, which you must screw very tight; leave them there till the whole is cold, and they will be soldered. If you do not succeed the first time repeat the process.

172. *Method of moulding Shells.*

PUT six pints of water into a kettle, add to it an ounce of olive, or other oil; make the water boil, then put in your shell, and it will grow soft. Take it out, and put it into a mould, under a press, and it will take the figure you want. This must be done quickly, for if the shell cool ever so little, the process will fail. It will not require much pressure.

173. *Method of tinging Bones and Ivory, Red.*

BOIL shavings of scarlet in water, when it begins to boil throw in a quarter of a pound of ashes made from the dregs of wine, which will extract the colour, then throw in a little rock alum to clear it, and pass the water through a linen cloth, steep your ivory or bone in aqua fortis, and put it into the water. If you wish to leave white spots, cover the places destined for them with wax.

174. *To tinge Ivory Black.*

STEEP the ivory during five or six days, in water of galls, with the ashes of dried dregs of wine and arsenic; then give it two or three layers of the same black with which plum tree is blackened, in order to imitate ebony; or dissolve silver in aquafortis, and put into it a little rose water. Rub the ivory with this, and allow it to dry in the sun.

175. *Method of hardening Wood to make Pulleys.*

AFTER finishing the pulley, boil it seven or eight minutes in olive oil, and it will become as hard as copper.

176. *To make Chinese Varnish.*

TAKE of gum lac in grains four ounces, put it into a strong bottle, with a pound of good spirits of wine, and add about the bulk of a hazle nut of camphor, allow them to mix in summer in the sun, or in winter on hot embers, for twenty-four hours, shaking the bottle from time to time, pass the whole through a fine cloth, and throw away what remains upon it. Then let it settle for twenty-four hours, and you will find a clear part in the upper part of the bottle, which you must separate gently, and put into another viol, and the remains will serve for the first layers.

177. *A Cement useful for Turners.*

TAKE rosin one pound, pitch four ounces, melt these together, and, while boiling hot, add brick dust, until, by dropping a little upon a stone, you perceive it hard enough, then pour it into water, and immediately make it up in rolls, and it is fit for use.

178. *Another finer Cement.*

TAKE rosin one ounce, pitch two ounces, add red ochre finely powdered until you perceive it strong enough. Sometimes a small quantity of tallow is used, according to the heat of the weather, more being necessary in winter than in summer.

Either of these cements is of excellent use for turners. By applying it to the side of a chuck, and making it warm before the fire, you may fasten any thin piece of wood, which will hold while you turn it. When you want it off again, strike it on the top with your tool, and it will drop off immediately.

179. *A method of restoring Whiteness to Ivory, after it is become Yellow or Red by long keeping.*

WHEN ivory is turned yellow or red by long keeping, boil it in strong lime water, suppose a pound of lime to a quart of water, and if that has not the desired effect, add more lime. This method never fails to bring it to a proper whiteness.

180. *To stain Wood Red.*

TAKE archal one pound, add oil of vitriol one-fourth, and it is ready for use; to make it strike deeper, add a little more oil of vitriol.

181. *To stain Wood Blue.*

DISSOLVE indigo, well bruised, one ounce in a pound of oil of vitriol, set it near the fire for two or three days, keep stirring it about with a stick, then dilute to what strength you please with water.

182. *To stain Wood Yellow.*

GAMBOGE or turmeric dissolved in oil of vitriol.

183. *A Black stain for Wood.*

HEAT a steel bar very hot, take it out of the fire and smear it over with brimstone, which will dissolve a part of the surface, scrape it off, and repeat this operation till all the steel is quite dissolved. or at least as much as you intend to use, then beat it to a fine powder and incorporate it with very strong alegar or vinegar, add thereto blue nut galls and a little copperas and alum; but before you lay the stain on, it will be proper to strike it over with boiling hot logwood water.

184. *To stain Wood Green.*

DISSOLVE gamboge in water, add of the blue stain to it as you see occasion; all the wood must be very white.

185. *To stain Wood Purple.*

BRUSH the wood to be stained several times with a strong decoction of logwood and brazil, made in the proportion of one pound of the logwood and a quarter of a pound of the brazil, to a gallon of water, and boiled for an hour or more. When the wood has been brushed over till there be a sufficient body of colour, let it dry, and then be slightly passed over with a solution of one drachm of pearl ashes in a quart of water. This solution must be carefully used, as it will gradually change the colour from a brown red, which it will originally be found to be, to a dark blue purple, and therefore its effect must be restrained to the due point for producing the colour desired.

186. *Method of staining Wood a Mahogany Colour.*

IT has been contrived to render every species of wood, of a close grain, so nearly to resemble mahogany in the texture, density, and polish, that the most accurate judges are incapable of distinguishing, between this happy imitation and the native produce. The first operation is to plane the surface so as to render it perfectly smooth, the wood is then to be rubbed with a solution of nitrous acid, which prepares it for the materials subsequently to be applied; afterwards one ounce and a half of dragon's blood dissolved in a pint of spirit of wine, and one-third of that quantity of carbonate of soda, are to be mixed together and filtered, and the liquid in this state is to be rubbed, or rather laid upon the wood with a soft brush.

This process is to be repeated with very little alteration, and in a short time the wood assumes the external appearance of mahogany. When this application has been properly made, the surface will resemble an artificial mirror, but if the polish become in time less brilliant, by the application of a little cool drawn linseed oil, it may be restored to its former brilliancy.

187. *To make good Black Ink.*

TAKE eight ounces of Aleppo galls in coarse powder, four ounces of logwood in thin chips, four ounces of sulphate of iron, (green copperas) three ounces of gum arabic in powder, one ounce of sulphate of copper, (blue vitriol) and one ounce of sugar candy. Boil the galls and logwood together in twelve pounds of water for one hour, or till half the liquid has been evaporated. Strain the decoction through a hair sieve, or linen cloth, and then add the other ingredients. Stir the mixture till the whole is dissolved, more especially the gum, after which leave it to subside for twenty-four hours. Then decant the ink, and preserve it in bottles of glass or stoneware, well corked.

188. *To make Red Ink.*

BOIL four ounces of Brazil wood in two pints of water for a quarter of an hour, and having added a little alum, gum arabic, and sugar candy, suffer the whole to boil for a quarter of an hour longer. This ink may be preserved a long time, and the older it grows it will still become redder.

189. *To make Green Ink.*

TAKE an ounce of verdigrise, and having powdered it, put it to a quart of vinegar, and after it has stood two or three days, strain off the fluid, or instead of this use the crystals of verdigrise dissolved in water, then dissolve in a pint of either of these solutions, five drachms of gum arabic, and two drachms of white sugar.

190. *To make Yellow Ink.*

BOIL two ounces of the French berries in a quart of water, with half an ounce of alum, till one-third of the fluid be evaporated, and then dissolve in it two drachms of gum arabic and one drachm of sugar, and afterwards a drachm of alum powdered.

191. *To make Blue Ink.*

BLUE ink may be obtained by diluting indigo and ceruse in gum water.

192. *To make Indian Ink.*

TAKE of isinglass six ounces, reduce it to a size by dissolving it over the fire in double its weight of water. Take then of Spanish liquorice one ounce, and dissolve it also in double its weight of water, and grind up with it an ounce of real ivory black, add this mixture to the size while hot, and stir the whole together till all the ingredients be thoroughly incorporated, then evaporate away the water in a boiling water bath, and cast the remaining composition into leaden moulds greased, or make it up in any form at pleasure.

The colour of this composition will be equally good with that of the Indian ink, the isinglass size mixt with the colours, works with the pencil equally well with the Indian ink, and the Spanish liquorice both renders it easily soluble on rubbing it with water, to which the isinglass alone is somewhat reluctant, and also prevents its cracking and peeling off from the ground on which it is laid.

193. *A simple Remedy against the Effects of Ink when just Spilled.*

THE moments spent in lamenting over an accident just happened, are but too often the only ones which could have prevented the dire consequences of it, nay perhaps might have repaired it entirely, without leaving the least stain, had we instantly applied the remedy. If the ink be spilled on a ruffle, or apron, &c. while you have it on, let one hold the affected part between his two hands over a bason and rub it, while another pours water gradually from a decanter upon it, and let a whole pitcher full be used if necessary; or if the ruffle, apron, &c. be at liberty, let it be dipped into a bason filled with water, and there squeezed and dipped in again, taking care to change the water in abundance every two or three squeezes. If the ink be spilled on a green table carpet, it may immediately be taken out with a tea-spoon so entirely, that scarcely any water at all shall be wanted afterwards, provided it was only that instant spilled, as the down of the cloth prevents the immediate soaking in of the ink, or of any other liquor, (except oil) but if it have lain some time, be the time ever so long, provided the place be still wet, by pouring on it fresh clean water by little and little at a time; and gathering it up again each time with a spoon, pressing hard to squeeze it out of the cloth into the spoon, you will at last bring it to its natural colour, as if no such accident had happened.

198. *Method of Writing on Paper, so that what is written will be invisible till held to the Fire, when it will immediately turn as Black as if written with the finest Black Ink.*

LETTERS written with oil of vitriol, diluted with as much water as will prevent it from corroding the paper, are perfectly invisible when dry, but instantly appear as black as if written with the finest ink, on being held to the fire. The proportions of the oil of vitriol and water, may be one part oil of vitriol and three parts water.

199. *How to Write in the Dark, as straight as by Day or Candle Light.*

THIS may be done by writing with a pencil on an ivory leaf, for if lines are drawn on the leaf, with a needle or any sharp point, they may be felt by the point of the pencil.

200. *The most easy and neat method of forming Letters of Gold on Paper, and for Ornaments of Writings.*

TAKE gum ammoniac and powder it, and then dissolve it in water, previously impregnated with a little gum arabic and some juice of garlic. The gum ammoniac will not dissolve in water, so as to form a transparent fluid, but produces a milky appearance, with the liquor thus prepared, draw with a pencil or write with a pen, on paper or vellum, the intended figure or letters of the gilding, suffer the paper to dry, and then, or any time afterwards, breathe on it till it be moistened, and immediately lay leaves of gold, or parts of leaves cut in the most advantageous manner, to save the gold over the parts drawn or written upon, and press them gently to the paper, with a ball of cotton or soft leather, when the paper becomes dry, which a short time or gentle heat will soon effect, brush off with a soft pencil, or rub off by a fine linen rag the redundant gold, which covered the parts between the lines of the drawing or writing, and the finest hair strokes of the pencil or pen, as well as the broader, will appear perfectly gold.

201. *Easy method of Copying Letters, &c. without the Use of a Copying Machine.*

THIS process is the more interesting, as it requires neither machine nor preparation, and may be used in any situation. It consists in putting a little sugar in common writing ink, and with this the writing is made on common paper sized as usual; when a copy is required, unsized paper is taken, and lightly moistened with a sponge. The wet paper is then applied to the writing, and a flat iron, such as is used by laundresses, of a moderate heat, being lightly passed over the unsized paper, the counterproof or copy is immediately produced.

202. *To make Camp Paper, with which Officers in the Army, &c. may write without Pen, Ink, or Pencil.*

TAKE some hard soap, mix it with lamp black, make it into the consistence of a jelly with water, with this brush over one side of your paper, and let it dry, when you use it, put it between two sheets of clean paper with its black side downwards, and with a pin or a stick with a sharp point, write what you please upon the clean paper, and where the tracer has touched, there will be the impression upon the lowermost sheet of paper, as if it had been written with a pen.

203. *Method of taking off Impressions of Plants, recommended by Dr. Lettsom.*

THE impressions of plants well taken off upon paper, look very little inferior to the best drawings, and may be done with very little trouble. For this purpose, some printer's ink, and a pair of printer's balls, such as are used for laying the ink on types are necessary; after rubbing these balls with a little of the ink, lay the plant between them and press it, so as to give it sufficient colour, then take the plant and lay it carefully on a sheet of paper, and press it with the hand, to give the impression of the plant to the paper, which may be afterwards coloured according to nature; a piece of blotting paper may be placed betwixt the plant and the hand, to prevent the latter from being dirtied by the ink. But if white paper be employed instead of blotting paper, we acquire at the same moment two impressions, or both surfaces of the same plant.

204. *To make Gun Barrels of a fine brown colour.*

AS a brown barrel seems to be the most pleasing to the sportsman, the following is a certain and easy method to perform it.

Rub your barrel bright with sand paper, or if bright scour it with dry brick dust, to take off all greasiness, and fit a stick or piece of wood into the muzzle long enough to hold it by.

Bruise roughly about half an ounce of stone brimstone, and sprinkle it over a gentle fire either of wood, coal, or charcoal, hold your barrel over the smoak, turning and drawing it backward and forward until it be equally tinged all over; this done set it in a cellar or damp room until next day, in which time you will find it has thrown out a fine rust, over which you may draw your finger to spread it even alike, and let it stand another day. If you perceive any parts that have not taken the rust, you are to scour such parts bright, and repeat the above operation.

It is then to be polished with a hard brush, which is first to be rubbed with bees wax, and after with a dry woollen or rough linen rag, which will make it look of a beautiful brown colour. This rubbing must be repeated every day so long as it throws out any roughness. No oil or grease should come on it for some time, as that may bring off the rust in places, but if by neglect it should get so strong a roughness that you cannot get it down with common rubbing, in that case wipe it over with sweet oil, and rub it off gently with a clean linen rag, and the next day you may polish it down with your brush as before directed.

Another method of browning Gun Barrels.

To give this colour, the pieces are first rubbed over with aquafortis or spirit of salt, diluted with water, after which they are laid by till a compleat coat of rust is formed upon them, a little oil is then applied, and the surface being rubbed dry, is polished by means of a hard brush and bees wax.

205. *Method of making Gun Powder.*

TAKE four ounces of refined salt petre, an ounce of brimstone, and six drachms of charcoal, reduce these to a fine powder, and continue beating them for some time in a stone mortar, with a wooden pestle, wetting the mixture between whiles with water, so as to form the whole into an uniform paste, which is reduced to grains by passing it through a wire sieve fit for the purpose, and in this form, being carefully dried, it becomes the common gun powder.

206. *Method of making Watts' Patent Shot.*

TAKE twenty hundred weight of soft pig lead, (more or less according to the slag or poisoned lead intended to be made) melt it in an iron pot, then take about a peck of coal ashes or dirt, strew the same round the edge of the pot upon the surface of the metal, leaving the middle of the metal exposed. Upon the metal which is left uncovered, put about forty pounds weight of white or yellow arsenic, then cover the pot with an iron cover, and close the edges of the cover all round the pot with mortar, clay, or dirt, to prevent the arsenic from evaporating, keep a good fire under the pot for three or four hours, so as to have the lead red hot, that the arsenic may be mixed with the lead, and the lead thereby be fully poisoned, then take off the cover and skim the metal, then lade it off into moulds or sand to cool, in bars or ingots, and which, when cool, is called slag or poisoned lead.—Then take another twenty hundred weight of soft pig lead, (according to the quantity of shot intended to be made) melt the same in an iron pot, then take about three quarters of an hundred weight of scum from clean pig lead, put it into the pot and let the same melt, when melted put in one of the bars or ingots of slag or poisoned lead, and when melted, with a small ladle, take some of the metal out of the pot, and drop it in water from the height of about two feet; if the shot be not round, put in more of the slag or poisoned lead till you find it drops round, then skim the metal, and put the scum into an iron or copper frame full of holes, according to the size of the shot intended to be made, squeeze the scum while soft in the frame with the ladle, with which it was taken out of the pot, then take the metal out of the pot, and pour it into the frame over the surface of the scum, and let it drop through the frame into water. If for the smallest shot, the frame must be at least ten feet above the water, and for the largest shot, about one hundred and fifty feet or more above the water, and so in proportion, according to the size of the shot intended to be made.

207. *To make an Electrical Machine without Globe, Cylinder, or Wheel.*

FOR common purposes, there are electrical machines constructed without either globe, cylinder, or wheel, as thus. Let two upright pieces of wood, of about two feet long, be joined at bottom by a cross piece, and let there be a gripe to fasten them to a table or any horizontal board. Against the inside of each of the perpendicular pieces fix a leather cushion, and let there be a hole made through each piece and cushion, opposite to each other. Then take a plate of glass about a foot square, and polished on both sides, through the middle of which let a workman make a hole, of the same size with those in the posts and cushions, if these holes be about nine inches from the top, you may work the machine either sitting or standing. Through all the holes let an axis be passed that has a handle at one end. The cushions are to press hard against the glass.

Next provide a conductor, which may consist of a small iron rod, fastened by sealing wax to an upright piece of wood, supported by a glass vessel of any sort, from the rod must go a wire, at the end of which are to be two large needles, that communicate with the two sides of the glass, and from each of the rubbers there must go a chain to the floor or table. When positive electricity is wanted, the needles are to communicate with the glass; and when negative electricity, with the cushions. With this machine, and a little care and practice, you will be enabled to perform all the common operations in electricity.

208. *Method of communicating the Magnetic Virtue to a Bar of Steel, without the help of a Natural or an Artificial Magnet.*

PROVIDE a plate of untempered steel about three inches in length, one quarter of an inch broad, and one-twentieth of an inch thick. Then take an iron poker and tongs, the larger they are, and the longer they have been used, the better, and fixing the poker upright between the knees, hold to it near the top the plate of steel, in such a manner that the extremity destined for the north pole may be turned downwards; in order that it may not be displaced it will be proper to tie it to the poker with a silk string. Then take the tongs, and holding them nearly in a vertical direction, rub the plate, with their extremities proceeding always from the bottom upwards. When this operation has been performed twelve or fifteen times, on both sides of the plate, it will have acquired sufficient magnetic virtue to raise small nails by its lower extremity.

It may be readily conceived, that when six or eight plates have been magnetised, they may be formed into a small bundle, for communicating the magnetic virtue to larger ones, which may be employed to give the like property to others of still greater size.

209. *To grind and polish Concave Lenses for Prospect Glasses, &c.*

PLACE an arbor or mandrill in a turner's lathe, whereon you can fix leaden wheels of what dimension you please, suppose one, two, or three inches diameter, and three eighths or half of an inch thick, (which are common sizes for making the above-mentioned instruments) you then prepare the glass by chipping it round with a pair of large scissars or small shears, to the size you want it, and either cement it to the end of a little short block of wood, made for that purpose, or hold it loose in your fingers upon the edge of the wheel, it having emery and water constantly applied to it all the while you are grinding.

In holding the glass, you must press moderately upon it, and keep turning it backward and forward all the time, so that it may have a true figure. When you have ground it deep enough, and you can observe no defect in its spherical figure, you must apply no more emery, but still keep working it upon the tool, with a very light hand; it would still be much better, if you had another wheel of the same diameter, on which you might apply a little ground pumice stone, in order to take out the strokes or scratches made by the emery. When you perceive it to be in a proper state for polishing, which you may do by examining it through a magnifying glass, and if no scratches nor holes appear, it is then ready for the polishing wheel, which is made of wood the exact size of the wheel on which it was ground, and a piece of clean linen cloth fastened double round its edge, then apply putty moistened with water, and work it in the same manner as when you ground it, and in a few minutes you will perceive it to have an excellent polish.

210. *To grind Convex Lenses for Microscopic Object Glasses, Eye Glasses, &c.*

FIRST provide an upright spindle, at the bottom of which a pulley is fixed, which must be turned by a wheel by means of a cord and handle: at the top of the spindle make a screw, the same as a lathe spindle, whereon you may screw chocks of different sorts, which may be made in the following manner.

Make a hole in a piece of wood just to fit tight upon the collar of the spindle, and turn it to one inch long, and one inch larger in diameter than the hole, place it on the collar at the chock end of the screw, and fold a piece of pasteboard round the wood, so that it may stand an inch above the top of the screw, then pour melted lead upon it till the paper is full, and when cold you may unscrew it and fix it in a lathe; screw the chock on again and turn it true on the end, take it off and solder a thick piece of brass upon it with soft solder, afterwards turn the brass to the concavity you intend it, as true as possible with the turning tool, after which apply it upon the edge of a wheel, of the same radius of a sphere, as the gage you turned it by, and by grinding it a little in the same manner as you grind concave glasses, it will be ready for use. Next prepare the glass by chipping it to the size you want it, and cement it on the end of a block of wood of the same diameter, and one, two, or three inches long, so as to hold it easily between your two fingers and thumb, make a concave gage of thin brass, the same radius of a sphere as the pan, and grind the edges of the glass upon a rough grinding-stone till it fits the gage, then it is ready for its spherical figure.

The next thing necessary is to prepare the emery, which is done in the following manner. Provide at least six earthen vessels, that will hold two or three quarts each, (taking care they are quiet clean when used) fill the first with water and put one pound of fine emery in it, and stir it well about with a stick, after which let it stand about three seconds of time, and then pour it into another vessel, which let stand ten seconds, then pour it off again into the several vessels, until the water is quite clear, and by this means you will obtain emery of as many degrees of fineness as you please, which must be kept separate from one another, and worked in their proper order, beginning at the first, and working off all the marks of the grinding-stone; then take of the second and third, &c. holding the glass upon the pan with a light hand, when it comes to be nearly fit for polishing; a little experience will make the practitioner perfect.

The polishing is performed as follows. After the glass is brought, by grinding with emery, to a fine surface, grind some pumice stone, by rubbing it with a little water upon a stone, and what rubs off must be used in the pan, (this is called bottoming) work it off with this till it is almost polished, which will easily be perceived, then tie a piece of linen rag about the pan, and with putty moistened with water, continue the grinding motion, and in a little time there will be an excellent polish.

211. *A Cement for Glass Grinders.*

TAKE pitch and boil it, add thereto, and keep stirring it all the while, fine sifted wood ashes, until you have it of a proper temper; the addition of a little tallow may be added, as you find necessary.

Another for small Work.

Take six parts rosin and one of bees wax, melt them together, and if too soft add more rosin, if too hard add more bees wax, &c.

212. Method of making littl. Glass Spherules for Microscopes.

A small piece of very fine glass, sticking to the wet point of a steel needle, is to be applied to the extreme bluish part of the flame of a lamp, or which is better, to the flame of spirit of wine, to prevent its being blackened; being there melted and run into a little round drop, it is to be removed from the flame, upon which it instantly ceases to be fluid, folding then a thin plate of brass and making very small smooth perforations, so as not to leave any roughness on the surfaces, and farther smoothing them over, to prevent any glaring, fit the spherule between the plates against the apertures, and put the whole in a frame with objects convenient for observation.

Another Way.

Take a piece of fine window glass, and raise it with a diamond into as many lengths as you think needful, not exceeding an eighth of an inch in breadth, then holding one of these lengths between the fore finger and thumb of each hand, over a very fine flame, till the glass begins to soften, draw it out till it be as fine as a hair and break, then applying each of the ends into the purest part of the flame; you have two spheres presently, which you may make larger or less at pleasure. If they stay long in the flame they will have spots, so they must be drawn out immediately after they are turned round; as to the stem, break it off as near the ball as possible, and lodging the remainder of the stem between the plates, by drilling the hole neatly round, all the protuberances are buried between the plates, and the microscope performs to admiration.

213. *A more expeditious and less expensive mode of cleansing Public Roads and Highways, than the one usually made use of.*

THIS is performed by the simple operation of working a roller backwards and forwards across the road. A wooden or cast iron roller two yards long, and two feet in diameter, by the labour of only two or three men, will cleanse a greater length of road during rainy weather, than twenty stout men could perform in the usual way, and in the same space of time; a scraper is placed so as to take off any mire which might adhere to the roller.

214. *Method of whitening interior Walls, by which they are rendered extremely beautiful, and will have a lustre like Marble or Stucco.*

PROCURE a quantity of the very best lime, and pass it through fine linen, pour it into a large tub furnished with a spigot, at the height equal to that which the lime occupies, fill the tub with clear fountain water, beat the mixture with large pieces of wood, and then allow it to settle for twenty-four hours, open the spigot, allow the water to run off, supply the tub with fresh water, and continue this operation for several days, until the lime receives the greatest degree of whiteness.

When you allow the water finally to run off, the lime will be found in the consistency of paste, but with the quantity you use it is necessary to mix a little Prussian blue or indigo, to relieve the brightness of the white, and a small quantity of turpentine to give it brilliancy. The size proper for it is made of glove leather, with the addition of some alum, and the whole is applied with a strong brush in five or six layers to new plaster.

The wall is strongly rubbed over with a brush of hogs bristles, after the painting is dry, which gives it its lustre and value, and makes it appear like marble or stucco.

215. *Method of employing Tiles for the Roofs of Houses, by which one half of the quantity usually required for that purpose is sufficient.*

M. CATHALA, a French architect, has invented a new method of employing tiles for the roofs of houses, by which one half of the quantity usually required for that purpose is sufficient. The tiles are to be made of a square, instead of an oblong form. The hook by which they are fastened is at one of the angles, so that when fastened to the laths, they hang down diagonally, and every tile is covered one fifth part on two sides, by the superior row.

A gentleman in this country, (Mr. Chiffney) some little time ago, obtained a patent for laying slates in a similar manner.

216. *Improved method of constructing Ventilators for Rooms.*

THERE are various ways of ventilation, or changing the air of rooms.

Mr. Tidd contrived to admit fresh air into a room, by taking out the middle upper sash pane of glass, and fixing in its place a frame box, with a round hole in its middle, about six or seven inches diameter, in which hole are fixed, behind each other, a set of sails, of very thin, broad copper plates, which spread over and cover the circular hole, so as to make the air, which enters the room, and turning round these sails, to spread round in thin sheets sideway, and so not to incommode persons by blowing directly upon them, as it would do if it were not hindered by the sails.

This method, however, is very unseemly and disagreeable in good rooms, and therefore, instead of it, the late ingenious Mr. John Whitehurst, substituted another, which was, to open a small square, or rectangular hole, in the party wall of the room, in the upper part, near the cieling, at a corner or part distant from the fire; and before it be placed a thin piece of metal, or pasteboard, &c. attached to the wall in its lower part, just before the hole, but declining from it upwards, so as to give the air that enters by the hole, a direction upwards against the cieling, along which it sweeps, and disperses itself through the room, without blowing in a current against any person. This method is very useful to cure smokey chimneys, by thus admitting, conveniently, fresh air. A picture, placed before the hole, prevents the sight of it from disfiguring the room.

217. *A ready method of distilling simple Waters.*

TIE a piece of muslin, or gauze, over a glazed earthen pot, whose mouth is just large enough to receive the bottom of a warming pan; on this cloth lay your herb, clipped, whether mint, lavender, or whatever else you please; then place upon them the hot warming-pan, with live coals in it, to cause heat just enough to prevent burning, by which means, as the steam issuing out of the herb cannot mount upwards, by reason of the bottom of the pan just fitting the brim of the vessel below it, it must necessarily descend, and collect into water at the bottom of the receiver, and that strongly impregnated with the essential oil and salt of the vegetable thus distilled; which, if you want to make spirituous, or compound water of, is easily done, by only adding some good spirits, or French brandy to it, which will keep good for a long time, and be much better than if the spirits had passed through a still, which must needs waste some of their strength.

Care must be taken not to let the fire be too strong, least it scorch the plants; and to be made of charcoal, for continuance and better regulation, which must be managed by lifting up and laying down the lid, as you want to increase or decrease the degrees of heat.

The deeper the earthen pan, the cooler the season; and the less fire at first (afterwards to be raised by gentle degrees) in the greater perfection will the distilled water be obtained.

As the more moveable, or volatile parts of vegetables, are the aqueous, the oily, the gummy, the resinous, and the saline, these are what we must expect in the waters of this process; the heat here employed being so great as to burst the vessels of the plants, some of which contain so large a quantity of oil, that it may be seen swimming on the surface of the water.

Medical waters thus procured will afford us nearly all the native virtues of vegetables, and give us a mixture of their several principles, whence they in a manner come up to the expressed juice, or extract gained therefrom: and if brandy be at the same time added to these distilled waters, so strong of oil and salt, a compound, or spirituous water, may be likewise procured, at a cheap and easy rate.

It is true, a small quantity only of distilled water can be obtained at a time by this confined operation, yet it makes up in strength what it wants in quantity.

Such liquors, if well corked up from the air, will keep good a long time, especially if about a twentieth part of any spirits be added, the better to preserve the same.

218. *Method of obtaining the fragrant Essences from the fresh rinds of Citrons, Oranges, &c.*

PROCURE as many fresh citrons from the Italian warehouses, as will supply the required stock of essence; after cleaning off any speck in the outer rinds of the fruit, break off a large piece of loaf sugar, and rub the citron on it till the yellow rind is completely abraded. Those parts of the sugar which are impregnated with the essence, are from time to time to be cut away with a knife, and put in an earthen dish. The whole being thus taken off, the sugared essence is to be closely pressed, and put by in pots, where it is to be squeezed down hard, have a bladder over the paper by which it is covered, and tied tightly up.

It is at any time fit for use, and will keep for many years. Exactly in the same manner may be obtained and preserved, at the proper seasons, from the fresh fruits, the essences of the rinds of Seville or China oranges, lemons, or limes, bergamots, &c. some of which are often unattainable in a fresh state, at any price.

This mode of extracting and preserving these essences, is superior to the common practices of peeling, rasping, or grating off the rind, and afterward mixing it up with powdered sugar, &c.

219. *How to make Syrups with all sorts of Flowers, which shall possess all their taste, flavour, and fragrancy.*

HEAT in a pan about half a pint of water, then put in it sugar in the proportion to the quantity of flowers you may have to boil, skim and thicken it to a proper consistency. When this is done put your flowers into a glazed vessel, and cover them over with a linen cloth, through which, pouring the syrup, you strain it upon the flowers.

These being thereby quite deadened, put all together again in the same piece of linen, and strain it again in another vessel, squeezing well the flowers. Then bottle this syrup, and keep it for use well stopped.

Whenever you want to give the flavour of these flowers to any liquor, sweeten it with this syrup.—To every four ounces of flowers, the quantity of sugar requisite to make that syrup, is generally one pound and a half.

Observe that all the flowers must be well picked of all their cups, stamina, &c. and nothing but their leaves made use of.

220. *New invented method of Hatching Chickens, and rearing them quicker for the Spit than was ever before discovered.*

THE chickens are to be taken away from the hen the night after they are hatched, and are to be replaced with eggs, on which the hen will continue to sit for a second and a third brood. When first taken from the hen, they are to be fed for the space of a fortnight, with eggs boiled hard and chopped fine, mixed with bread, as larks and other birds are fed, after which give them oatmeal and treacle, so mixed that it will crumble, of which the chickens are so fond, and with which they thrive so fast, that at the end of two months they will be as large as full grown fowls.

221. *Method of correcting the Putrid Smell which Meat acquires in hot weather.*

THE following is the process published by Mr. Adam, Professor of Philosophy, at Caen.

It is well known that in warm and damp weather, or during a storm, meat becomes corrupted in the butchers' shops, in larders, and even in the driest places, that it contracts a fetid and nauseous smell, which it retains after it has been boiled, and that the broth or soup made of it is equally disagreeable. This smell I considered as the effects of gas, which expands as soon as the putrid fermentation begins, and I thence concluded, that if the gaseous particles could be extracted from the meat or broth, nothing of that nauseous smell would be perceived, I therefore endeavoured to find an absorbent capable of producing this effect.

After different attempts, I at length thought, that by throwing into the saucepan or kettle, in which the meat is boiling, a burning coal, it would absorb the gas, because the fiery particles issuing with impetuosity from the coal, while the water cannot penetrate into it, the pores of the coal remaining open, the subtle gas, which has a great affinity to the phlogiston of the coal, might insinuate itself into it, and remain there fixed, by disengaging itself from the meat and broth, which are impregnated with it. I therefore made the experiment, which succeeded according to my wish. Every time I had an opportunity I made a trial of my discovery, and others to whom I communicated it found it to answer equally well. The manner of proceeding in this operation is as follows.

First put the meat intended for making soup into a saucepan full of water, skim it when it boils, and then throw into the saucepan a burning coal, very compact and destitute of smoke, leave it there for two minutes, and it will have contracted all the smell of the meat and soup.

again on the soiled part ten or twelve times successively, pressing lightly upon it, and the soil will entirely disappear. No spot occasioned by any unctuous substance has ever resisted this process.

224. *The most approved method of preserving Potatoes from Frost.*

THIS method, as recommended by the Board of Agriculture, is that of digging, in a very dry spot, trenches, six feet wide and eighteen inches deep; spread straw, pile the potatoes into the shape of the roof of a house; cover tight and close with straw, six inches thick, and then with earth, fifteen to eighteen inches more, flatted regularly and firmly, and sharp at top, raised from three to five feet above ground. If there should be any apprehensions of moisture, dig a trench at a few yards off, deeper than that in which the roots are laid. The drier they are, when thus packed up, the safer they will be.

225. *A Composition for Roofing Houses, as communicated by the Royal Society of Sweden.*

LET tar be boiled in an iron pot; get charcoal finely powdered, mix it with the tar, by constantly stirring it till the whole is reduced to the state of mortar, and spread it upon a boarded covering with a broad wooden trowel, to the thickness of one fourth or fifth of an inch, it will become hard and durable. Neither the heat nor cold of this climate will affect it: it is with this composition that the peasants of Sweden cover their houses.

226. *Observations on the Leech Worm, by a Gentleman who kept one several Years, for the purpose of a Weather Glass.*

A phial of water, containing a leech, I kept on the frame of my lower sash chamber window, so that when I looked in the morning, I could know what would be the weather of the following day.

If the weather continues serene and beautiful, the leech lies motionless at the bottom of the glass, and coiled together in a spiral form.

If it rains either in the forenoon or afternoon, it is found crept up to the top of its lodging, and there it remains till the weather is settled.

If we are to have wind, the poor prisoner gallops through his limpid habitation with amazing swiftness, and seldom rests till it begins to blow hard.

If a storm of thunder and rain is to succeed, for some days before it lodges almost continually without the water, and discovers great uneasiness, in violent throws and convulsive-like motions.

In frost, as in clear, summer weather, it lies constantly at the bottom; and in snow, as in rainy weather, it pitches its dwelling upon the very mouth of the phial.

What reasons may be assigned for them, I must leave philosophers to determine. Though one thing is evident to every one, that it must be affected in the same way with that of the mercury and spirits in the weather glass, and has, doubtless, a very surprising sensation, that the change of weather, even days before, makes a visible alteration upon its manner of living.

Perhaps it may not be amiss to note, if any of the curious should be disposed to try the experiment, that the leech is to be kept in a common eight ounce phial glass, about three-fourths filled with water, and covered on the mouth with a bit of linen rag. In the summer time, the water is to be changed once a week; and in the winter, once a fortnight.

This is a weather glass which may be purchased at a very trifling expence, and which will last for years.

227. *Method of cleansing musty Casks.*

IT was the secret of a countryman, who made a considerable profit by it.

He took cow dung, very fresh, the moment it came from the animal's body; he diluted it with a quantity of warm water, so as to make it sufficiently liquid to pass readily through a large tunnel. He previously dissolved in this water four pounds of common salt, (muriate of soda) and one pound of common alum (sulphate of alumine and pot ash). The quantity of this liquid was equal to about a sixteenth part of the capacity of the cask. He put the whole in a pot, and heated it almost to ebullition, stirring it continually with a wooden spatula. He poured the hot liquor into the barrel, bunged it tight, and shook it five or six minutes in the same manner as if rinsing the barrel. He shook it in this manner every two hours, taking care after every shaking to pull out the bung, when a thick vapour, with a strong smell of must, issued from it. Twenty-four hours afterwards he rinsed the barrel, till the water came from it perfectly clear. During this operation some water was heated, in which had been put two pounds of salt, and half a pound of alum, which he poured quite hot into the barrel, he shook it once, as in the former operation, and left the barrel well bunged. Two hours after, the water being still warm, he emptied it out, leaving the barrel to drain, and bunged it up very tight, till it should be wanted for use.

228. *Another method of Purifying Casks.*

THE process of charking fails only in the fire, not being able to penetrate into the chasms or chinks of the cask, into which the coopers (to mend bad work) often insert strips of paper, or other substances, to make it water tight, which in time becomes rotten and offensive, now in order to remedy this, the following is a method found by experience to answer the required purpose.

Into a cask containing a quantity of water (say about two gallons in a hogshead) put about one-tenth of its weight of sulphuric acid (vitriolic acid, or oil of vitriol) and let this be shaken about for some time, this is to be poured out, the cask well washed, and then swilled with a few gallons of lime water. It were needless to say that this ought likewise to be washed out. Sulphur mixed with a little nitre, burnt in the closed vessel, and then the subsequent process of lime water, &c. would do, and perhaps as well.

The theory is, that sulphuric acid has the property, when used alone, of charking wood, and when diluted, has sufficient strength to destroy must, &c. with the additional advantage of entering into every crevice.

The lime, in solution, seizes any particle of acid which the first washing might leave, and converts it into an insoluble inoffensive neutral salt, such as, if left in the cask, would not in the least injure the most delicate liquor.

229. *A method of protecting Persons employed in Gilding from the pernicious effects of Mercury.*

WHEN the gilders have coated a piece of metal with an amalgam of gold and mercury, they put it into the fire, that the mercury may evaporate, and the gold alone be left upon the metal, and they intercept and save the mercury which flies off, by stopping the chimney of their furnace with a wisp of hay, during this operation, they must take in by respiration a considerable quantity of mercurial vapours, which diffuse themselves all over the room. These vapours are extremely pernicious, they make the gilder pale and emaciated, and bring on irremediable tremors.

To prevent these ill effects, gilders, in the first place, may have two doors in their work-room, opposite to each other, which they should keep open, that there may be a free circulation of air, besides they should have a piece of gold applied to the roof of the mouth during the whole time of the operation. This piece will attract and intercept the mercury as they breathe, and when it grows white they must cast it into the fire, that the mercury may evaporate, and replace it when it is cool again. They should, indeed, have two pieces of gold, that one may be put into the mouth whilst the other is purifying and cooling, by these means they will preserve themselves from the diseases and infirmities which mercury occasions.

Those who are apprehensive of the ill effects of mercury, which they have already drawn in with their breath, may get rid of all or the greatest part of it by this easy method. Let them melt a few leaves of gold in a crucible, and when it is cold swallow it, the gold, not being dissoluble, will pass through the body in its metallic state, and in its way will attract and collect all the mercurial particles it meets with. The gilders know where to find the gold again, and may soon purify it by passing it through the fire. Thus they will preserve their health, without loss, pain, or danger.

230. *Method of preparing a Substitute for Gum in thickening of Colours for Linen and Calico Printing, which will answer all the purposes of that article, at a much more reasonable rate.*

THE gum substitute to thicken colours for linen and calico printing, and making up or furnishing printers' colour tubs, and applicable also to several other uses, is prepared by boiling any quantity of flax seed in a sufficient quantity of water, until the whole substance be extracted, and having strained it through a linen or woollen cloth, again boiling down the liquor to the consistence of a jelly. This is to be put into a close vessel, and for preservation, along with it a little strong spirits, or a little sweet oil on the top of it, bitters may also be used to preserve it. In using the substitute, the printer may either put a certain quantity into a gallon of colour, according to the nature of it and the particular kind of work to be done, and regulate himself by trial, as is common in using gum, or he may reduce the substitute, by boiling in water to the consistence wanted..

231. *Method of effectually extinguishing Fire, without any danger of its breaking out afresh.*

AS soon as an engine is in readiness to work, stir into the water immediately to be discharged, seven or eight pounds of pearl ash in powder, and continue to add it in this manner as occasion requires, taking care that it be directed against the timber or wainscot, &c. just beginning to burn, and not wasted against the brick work. Or where time will admit, dissolve any quantity of pearl ash in a copper with water, and as fast as it dissolves (which will be in a few minutes) mix a pailful with the water in the engine pretty often, and whatever burning wood it is played upon, will be extinguished as if it was dipped in water, and will not burn afresh in the part extinguished.

232. *A very simple but effectual method of rendering all sorts of Paper Fire-proof.*

THIS is produced by a most simple cause. It is only necessary, whether the paper be plain, written or printed on, or even marbled, stained, or painted, for hangings, to dip it in a strong solution of alum water, and then thoroughly dry it, when it will immediately become fire-proof, This is readily known, by holding a slip of paper thus prepared over a candle. Some paper requires to imbibe more of the solution than it receives by a single immersion, in which case the dipping and drying must be repeated, till it becomes fully saturated, when neither the colour nor quality of the paper will be in the least affected, but on the contrary, will be improved.

233. *To preserve Books from the depredations of Worms and Insects.*

TO give these mites a dis-relish for books, mineral salts, to which all insects have an aversion, afford the only remedy. The salt called arcanum duplicatum, alum, and vitriol, are proper for this purpose. By mingling, therefore, a small quantity of any of these mineral salts in the paste, books will be effectually preserved from the attacks of all sorts of worms and insects. If book-binders were to make their paste of starch, instead of flour, worms would not touch the books. Also pulverised alum mixed with a little fine pepper, strewed between the book and the cover, and also upon the shelves of the library, and for the more effectual preservation of books in libraries, rubbing the books well in the months of March, July, and September, with a woollen cloth dipped in powdered alum; and it were to be wished that all book-binders would make their paste in the manner recommended, but I would not advise depending upon starch, without an admixture of mineral salts.

234. *Method of obtaining Skeletons of a Mouse or a Frog, &c. exquisitely beautiful and perfect, and far surpassing any thing that can be executed by artificial Anatomy.*

IF a mouse, frog, or other like animal, be placed in an ant hill, it will be devoured in a few days to the bones and ligaments. Hence we are furnished with a method of obtaining skeletons of those animals exquisitely beautiful and perfect, far surpassing any thing that can be executed by artificial anatomy.

The subject is for this purpose to be inclosed in a wooden box, and properly distended, to prevent the parts from collapsing or being crushed together by the earth. The box is to be perforated with a number of holes, through which the insects will presently find their way.

235. *To restore the Bark of Trees that have been peeled by Sheep or other Animals in the Winter season.*

IN the transactions of the London Society for the encouragement of arts, &c. for 1796, there is a recent discovery made by Mr. Fairman, of Lynstead, Kent, for restoring the bark of trees that have been peeled by sheep or other animals in the winter season. The method he describes as follows.

In the severity of the spring of 1794, some fatted sheep were turned into a fine orchard of about twenty years growth, where, in a short time, they stripped the bark from several of the trees entirely round the bodies, leaving the wood bare for at least sixteen inches. The first step which I took to remedy this accident, was to cut off the arms from several of the trees which were most injured; and from the largest of those arms I took off slips of rind, of about two or three inches in width, and placed them perpendicularly round the naked body of the tree, so as completely to fill up the deficient bark.

But I first cut away the uneven or damaged rind, that was bitten, and then raised the edges of the bark up at top and bottom, and put the ends of the slips under, that the sap might circulate, and afterwards bound them round very tight, with rope yarn. I then applied a composition of loam and cow dung, with a little drift sand, over which I tied some old sacking, which was the whole of the process.

The event of this experiment was, that the slips adhered to the tree, united with each other, and became as full of sap as any other part, and the trees are now as strong and vigorous as if they had received no injury; and are as healthy and luxuriant as any in the orchard. If, therefore, the barking of trees subjects them to decay, this must be considered as a very valuable discovery.

236. *Method of manufacturing Starch from Materials not used as Food for Man.*

IN the year 1797, the Society of Arts adjudged a premium to Mrs. Jane Gibbs, of Portland, Dorsetshire, for the discovery of this method of making starch; and the following is the process described by her, and which is inserted in the transactions of the Society for that year.

The plant from which it is prepared is here called lords and ladies (arum vulgare maculatum) the roots are found in the common fields, and being cleansed and pounded in a stone mortar, with water, the whole is then strained, and, after settling, the water being poured off, the starch remains at the bottom, which, when dried, becomes a fine powder.

It may be adviseable during the preparing of starch from the roots of this plant, to be careful in handling them, lest their acrid quality may injure the hands.

It is believed a peck of the roots will make about four pounds of starch; though in the operation a lesser quantity is obtained from some roots than from others.

237. *Method of making Molasses from Apples, without the addition of Sugar.*

THE apple that succeeds best in this operation is a summer sweeting, of a middle size, pleasant to the taste, and so full of juice, that seven bushels will make a barrel of cyder.

The manner of making it is this: the apples are to be ground and pressed; then the juice is to be boiled in a large copper, till three-quarters of it be evaporated. This will be done with a moderate fire, in about six hours, with the quantity of juice abovementioned: by this time it will be of the consistence and taste, as well as of the colour of molasses.

This new molasses serves for all the purposes of the common kind, and is of great use in preserving cyder

Two quarts of it, put into a barrel of racked cyder, will preserve it, and give it an agreeable colour.

238. *Easy method to take off the fine Engravings from Watch Cases, Snuff Boxes, &c.*

HOLD them over the smoke of a candle till they are quite black; then wiping off the black with the soft part of the palm of your hand, lay a piece of white paper, a little wetted with a sponge, over the engraving; and over that lay a thin piece of flannel, or brown paper, pressed down very hard, which, being rubbed, the paper next the picture will obtain as fine an impression as if it had passed through a rolling press.

239. *To lay Mezzotinto Prints upon Glass.*

PROVIDE a clear plate of glass, as straight as possible, a little larger than the print; then steep the print, flat way, in warm water, about an hour, and with a thin knife spread Venice turpentine, or varnish, exceedingly thin and even, over one side of the glass, which must be kept warm, that the turpentine may spread the better: and observe, that there be not the least speck of the glass uncovered with the turpentine. Then take the print out of the water and lay it on a smooth table, between two cloths, or several folds of paper, in order to take out the superfluous water.

When this is done, lay the print upon the glass, by degrees, beginning at one end, and stroke outwards that part which is fastened to the glass, that no wind or water may lie betwixt, as it will cause blisters, which you must be careful to stroke out. The print being laid upon the glass in the most exact manner, proceed to rub it with your finger until all the thickness of the paper is come off in little rolls, and nothing is left upon the glass but a little film, like a spider's web: that is fast stuck to the glass by the turpentine, &c. great care must be taken in rubbing, that no holes are made in the print, especially in the lights, which are the most tender parts. If the print be large, so that some parts of the paper become dry, while you are rubbing the other, you should, with a little water on your finger, wet them as you see occasion to keep them moist, for the paper will not rub when dry. When you have rubbed the paper till it appears transparent on the back, set it up to dry for three or four hours, after which varnish it over with turpentine, or mastic varnish, two or three times, or until you see it transparent; and after it has stood a day or two to dry, proceed to paint it with either oil or varnish colours.

The choice and treatment of the colours for painting in this way upon glass, in either oil or varnish, may be the same as for any other methods, and it is, therefore, needless to enumerate any further particulars.

240. *An easy method of making a Phosphorus that will imbibe and emit Light, like the Bolognian Stone.*

CALCINE some common oyster shells, by keeping them in a good coal fire for half an hour; let the purest part of the calx be pulverised, and sifted; mix with three parts of this powder one part of the flowers of sulphur: let this mixture be pressed into a crucible of about an inch and a half in depth, till it be almost full, and let it be placed in the middle of the fire, where it must be kept red hot for one hour at least, and then set by to cool: when cold, turn it out of the crucible, and cutting or breaking it to pieces, scrape off, upon trial, the brightest parts, which, if good phosphorus, will be a white powder, and may be preserved by keeping it in a dry phial, with a ground stopple.

The quantity of light a little of this phosphorus gives, when first brought into a dark room, after it has been exposed for a few seconds on the outside of a window, to the common light of the day, is sufficient to discover the time by a watch, if the eyes have been shut, or in the dark, for two or three minutes before.

By this phosphorus, celestial objects may be very well represented; as Saturn and his ring, the phases of the moon, &c. if the figures of them, made of wood, be wetted with the white of an egg, and then covered with this phosphorus; and these figures appear to be as strongly illuminated in the night by the flash from a near discharge of an electrified bottle, as by the light of the day.

241. *The ancient Grecian method of Painting.*

TAKE an ounce of white wax, and the same weight of gum mastic, in drops as it comes from the tree, which must be reduced to a coarse powder, put the wax in a glazed earthen vessel over a very slow fire, and when it is quite dissolved strew in the mastic, a little at a time, stirring the wax continually until the whole quantity of gum is perfectly melted and incorporated, then throw the paste into cold water, and when it is hard take it out of the water, wipe it dry, and beat it in a mortar, observing to pound it at first in a linen cloth, which will absorb the particles of water that will remain in the paste, and would prevent the possibility of reducing it to a powder, which must be so fine as to pass through a thick gauze. It should be pounded in a cold place, and but a little while at a time, as after long beating the friction will in a degree soften the wax and gum, and instead of their becoming a powder, they will return to a paste.

Make some strong gum arabic water, and when you paint take a little of the powder, some colour, and mix them together with the gum water. Light colours require but a small quantity of the powder, but more of it must be put in proportion to the body and darkness of the colours, and to black there should be almost as much of the powder as colour.

Having mixed the colours, and no more than can be used before they grow dry, paint with fair water, as is practised in painting with water colours, a ground on the wood being first painted, of some proper colour, prepared in the same manner as is described for the picture, walnut tree and oak are the sorts of wood commonly made use of in Italy for this purpose.

The painting should be very highly finished, otherwise, when varnished, the tints will not appear united.

When the painting is quite dry, with rather a hard brush passing it one way, varnish it with white wax, which is put into an earthen vessel, and kept melted over a very slow fire, till the picture is varnished, taking great care the wax does not boil. Afterwards hold the picture before a fire, near enough to melt the wax, but not to make it run, and when the varnish is entirely cold and hard, rub it gently with a linen cloth; should the varnish blister, warm the picture again very slowly, and the bubbles will subside.

When the picture is dirty, it need only be washed with cold water.

242. *Method of preventing Stone Retorts from breaking, and of stopping them when cracked during any Chemical operation, without losing any of the contained subject.*

THIS method was invented by Mr. Thomas Willis, and the following is the process described by him in the fifth volume of the transactions of the Society of Arts, &c.

I have always found it necessary to use a previous coating for filling up the interstices of the earth or stone, which is made by dissolving two ounces of borax in a pint of boiling water, and adding to the solution as much slaked lime as will make it into a thin paste, this (with a common painter's brush) may be spread over several retorts, which, when dry, are then ready for the proper preserving coating. The intention of this first coating is, that the substances thus spread over, readily vitrifying in the fire, prevent any of the distilling matters from pervading the retort, but do in no wise prevent it from cracking.

Whenever I want to use any of the above coated retorts, after I have charged them with the substance to be distilled, I prepare a thin paste, made with common linseed oil and slaked lime, well mixed and perfectly plastic, that it may be easily spread, with this let the retorts be covered all over, except that part of the neck which is to be inserted into the receiver, this is readily done with a painter's brush; the coating will be sufficiently dry in a day or two, and they will then be fit for use.

With this coating I have for several years worked my stone retorts, without any danger of their breaking, and have frequently used the same retort four or five times, observing, particularly, to coat it over with the last-mentioned composition, every time it is charged with fresh materials. Before I made use of this expedient, it was an even chance, in conducting operations in stone and earthen retorts, whether they did not crack every time, by which great loss has been sustained.

If, at any time during the operation, the retorts should crack, spread some of the oil composition thick on the part, and sprinkle some powder of slaked lime on it, and it immediately stops the fissure, and prevents any of the distilling matter from pervading; even that subtile, penetrating substance phosphorus, will not penetrate through it.

It may be applied without danger, even when the retort is red hot, and when it is made a little stiffer, is more proper for luting vessels than any thing I ever have tried, because, if properly mixed, it will never crack, nor will it indurate so as to endanger the breaking the necks of the vessels when taken off.

243. *To make a Preparation, or Cement, for the purpose of preserving Ships and Vessels from Worms, Insects, or Vermin of any kind; and for various purposes in Agriculture and Commerce.*

THIS preparation, or cement, for the purpose of preserving his Majesty's, and other ships and vessels, from worms, &c. by the paying of their sides and bottoms, and for various purposes in agriculture and commerce, for preserving buildings, &c. made of wood, from the weather, is to be performed in the following manner; that is to say, take of powdered, or small pieces of resin, fourteen pounds; sand, sifted and washed clean from dirt or loam, twenty-eight pounds; red lead, three pounds and a half; oil, one pound and three-fourths; melt the resin over a moderate fire, put the sand and lead in by degrees, then put in your oil; when they are boiling, keep them constantly stirring, till cold, that you may have a uniform mass. Take of this mass, or cement, such quantity as may suit your purpose, broken into small pieces, and to every twelve pounds put in a bare half pound of oil, when melted apply it to what you design, either by pouring it on, or using it with a brush, whilst boiling hot. It is to be observed, that your oil to be added to the cement, must be of that sort which chemists call fat oil, and that more or less must be used as you want the composition to be harder or softer. This will be of a reddish colour; for the white and green, use ceruse and verdigrease, in the same proportion as the minium or red lead.

244. *Easy method of preparing Flesh Meat without Spices, and with very little Salt, yet so as to keep good and always ready for eating for two or three years, and in the warmest climates.*

JONES, in his micellanea Curiosa, gives us this description of the Moorish elcholle, which is made of beef, mutton, or camel's flesh, but chiefly beef, and which they cut in long slices, salt it well, and let it lie twenty-four hours in the pickle. They then remove it out of those tubs or jars into others with water, and when it has lain a night they take it out, and put it on ropes in the sun and air to dry, when it is thoroughly dried and hard, they cut it into pieces of two or three inches long, and throw it into a pan or cauldron, which is ready with boiling oil and suet, sufficient to hold it, where it boils till it is very clear, and red on being cut. When it is taken out it is set to drain, and when all is thus done, it is left to stand till cool, and jars are prepared to put it up in, pouring upon it the liquor in which it was fried, and as soon as it is thoroughly cold they stop it up close. It will keep two years, it will be hard, and the hardest they look on to be best done. This they dish up cold, sometimes fried with eggs and garlic, sometimes stewed and lemon squeezed on it. It is very good any way, either hot or cold.

245. *Method of dying Paper, Card Paper, and white Leather, on the Grain side, of various Colours.*

THE colours for leather are these following, viz. red, blue, green, black, with various shades of each. The reds are various, and are produced by a tincture of carmine, of cochineal and madder, or of cochineal heightened by a solution of tin; or lastly, from decoction of brazil and alum, in malt liquor.

Blue is produced from a solution of indigo, in oil of vitriol. The green is a mixture of the blue with any yellow tincture, at pleasure. Blacks are produced from the blue, added to a tincture of galls, sumach, and campeachy wood; stricken black, by a tincture of steel, or sal martis.

The colours for paper are all the above-mentioned, prepared in the same manner, together with yellow, purple, orange, brown, and their several intermediate degrees of variation. Yellow is produced by a tincture of French berries, with saffron, as also by most of the yellow dies now commonly used for those purposes. Orange is produced by the mixture of the yellow with madder; purples by the mixture of logwood with the blue tincture, or from cochineal, with sal martis or tincture of steel.—Browns are obtained from arnotto and japan earth, with galls and sal martis.

With respect to leathers, the mode of application is, to dip them on the grain side so long and so often as may be found requisite for the depth of colour desired. This is to be done in a flat pan, or vessel, capable of receiving the leather extended therein, with its grain side on the liquor. When dry, they are to be washed with a spunge, and soap and water, and finished by rubbing with dry flannel; except the blacks, which are to be oiled before they are washed.

With respect to papers, they are to be procured from the mills unsized, and in that state passed gently through the colouring liquor, mixed with such a portion of size as the intended degree of stiffness may require, which may be done either by the hand, or by a contrivance similar to that used in the paper mills for sizing their paper; and this is to be continued till the paper has acquired the intended depth of colour. After which it is to be hung upon fine horse-hair lines, or glass tubes, and when the colour is become, what the dyers call, set, then it is to be passed through cold water, and hung up to dry; after which it is to be pressed and polished, according to the use for which it may be intended. In the above applications the tinctures are to be used hot or cold, as may best suit the depth of colour required.

246. *The method of dying Leather of a Saxon Green.*

THE skins, after being prepared in the usual way, to receive the dye, are dipped and soaked several times, in a strong decoction of the wood of the barberry. (berberis. vulg. Linn.) By this means they acquire a deep and permanent yellow; they are then dried, and afterwards dipped in a bath of Saxon blue, till they become of the desired tint of green.

The bath of Saxon blue is nothing more than a dilute solution of sulphat of indigo, prepared by digesting indigo in a strong vitriolic acid, assisted by a gentle heat, till it is dissolved: in this state, the liquor is black, but by largely diluting it with water, it becomes of a beautiful blue, called the Saxon blue.

The tint of this is far more vivid than can be produced in the common indigo vat, but it has the disadvantage, when used by itself, of being much less permanent.

247. *Method of making Magnets, in imitation of the Natural Magnets.*

TAKE some martial æthiops, or which is more easily procured, reduce into very fine powder the scales of iron, which fall from the metal when made red hot and hammered; these are found in abundance in smith's shops; mix this powder with drying linseed oil, so as to form it into a very stiff paste, and shape it in a mould, so as to give it any form you require, whether of a terrella, a human head, or any other. This done, put it into a warm place for some weeks, and it will dry so as to become very hard; then render it magnetic by the application of powerful magnets, and it will acquire a considerable power.

248. *How to take Impressions with Isinglass from Copper Plates.*

TAKE fine white isinglass as much as you please, cut it fine, and put it into a glass or cup, pour on it as much brandy as will just cover the isinglass, close it well, and let it soak for twenty-four hours, then pour some clear water to it, and boil it on a gentle coal fire, until a drop of it put on a knife is like a clear jelly, strain it then through a cloth, and put it into a cool place, where it will jelly, and be ready for use.

When you are about casting a picture, cut so much of the jelly as you think you have occasion to cover the copper plate with, dissolve it in a clean pipkin, or such like utensil, over a slow coal fire, and mix any of the colours to be hereafter mentioned amongst it, mean while your copper plate must be cleansed, then wipe the plate carefully with clean hands, as the copper plate printers do, and when this is done pour your dissolved isinglass over it, but not too hot, spreading it with a pencil very even every where, until your copper plate is covered, set it then in a moderate warm place to dry, and when you perceive it thoroughly dry, then, with the help of a thin blade of a knife, you may lift it up from the plate; if you find the matter has been made too thin add more isinglass to it, but if too thick add a little more water, and boil it again.

The following are the colours to be mixed with the isinglass.

For red—vermillion, or carmine finely ground.

For blue—take litmus dissolved in fair water, and mix it.

For green—take distilled verdigrease, grind it as fine as possible, and mix it.

For yellow—steep saffron in fair water, and mix it. A gold colour is made with the above red and saffron yellow.

249. *To make a bunch of Grapes of Green Wax seem natural.*

GET a little stick rounded and pointed at the end, and then have your vessel of green wax melted, dipping your stick in the same about the third part of an inch deep, and it will be almost in the form of an acorn cup, make a good many of these. Then, take an egg, and making a little hole in the biggest end of the shell, get out the yolk, and dry the shell, then, with a piece of your green wax, hold it to the fire, and rub it therewith thinly all over, hold the shell in one hand, and with your other take up one of the cups, holding it for a little time near a candle to warm, and stick it quickly on the egg, and do the same with the rest of your cups till you have filled it all over, they must be set somewhat close together. Now when you have thus done, take a small piece of wood, about half an inch long, and tying a packthread in the middle of it, put it into the hole of the shell and hang it up, you may cut leaves like vine leaves in green paper, and fasten them to the string, or stalk, above the bunch.

250. *To make a Composition for preserving Weather Boarding, &c. from the injuries of the Weather.*

TAKE three parts of air slaked lime, two of wood ashes, and one of fine sand, or sea coal ashes; sift these through a fine sieve, and add as much linseed oil as will bring it to a consistence for working with a painter's brush; great care must be taken to mix it perfectly. I believe grinding it as paint, would be an improvement; two coats are necessary, the first rather thin, the second as thick as can conveniently be worked.

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251. *To construct two Figures to be placed at the two ends of a Hall, one of which shall repeat to the ear of a Person, what has been whispered into the ear of the other Figure, without being heard by any other Person in the Hall.*

PROVIDE two heads or busts made of plaster of Paris, or pasteboard, resting on pedestals, and place them in a hall, at such a distance from each other as you may think proper. Then convey a tube of tin plate, an inch in diameter, from the ear of one of the figures through the pedestal on which it rests, and below the flooring, till it reaches the mouth of the other figure, passing through its pedestal in the same manner as that of the former; this tube must be a little wider at each of its extremities, somewhat in the form of a funnel.

When it is necessary to bend this tube, care must be taken to cover the interior angles with a piece of tin plate, inclined to an angle of 45 degrees, that the voice may be directly reflected from one part of the tube to the other, and that the sound may be conveyed distinctly to the ear.

This construction will produce the following effect. If a person whispers into the ear of one of these figures, the words he pronounces will be distinctly heard by a second person, who applies his ear to the mouth of the other figure.

It is not necessary that the tube should come to the lips of the figure.

If there be two tubes, one going to the ear and the other to the mouth of each head, two persons may converse together by applying their mouth and ear reciprocally to the mouth and ear of the figures; and at the same time, other persons that stand in the middle of the hall, between the figures, will not hear any part of their conversation.

252. *To make the Solar Magic Lanthorn.*

PROCURE a box, of about a foot high, and eighteen inches wide, or such other similar dimensions as you shall think fit, and about three inches deep. Two of the opposite sides of the box must be quite open, and in each of the other sides let there be a groove, wide enough to pass a stiff paper, or pasteboard. This box must be fastened against a window, on which the sun's rays fall direct. The rest of the window should be closed up, that no light may enter.

Provide several sheets of stiff paper, which must be blacked on one side: on these papers cut out such figures as you shall think proper, and placing them alternately in the grooves of the box, with their blacked sides toward you, look at them through a large and clear glass prism; and if the light be strong, they will appear to be painted with the most brilliant colours in nature. If you cut on one of these papers the form of the rainbow, about three-quarters of an inch wide, you will have a lively representation of that in the atmosphere.

This recreation may be farther diversified by pasting very thin papers lightly painted with different colours, over some of the parts that are cut out, which will appear to change their colours, when viewed through the prism, and to stand out from the paper at different distances, according to the different degrees of refrangibility, of the colours with which they are painted.

For greater convenience the prism may be placed in a stand, on a table, at the height of your eye, and made to turn round on an axis, that when you have got an agreeable prospect you may fix it in that position. This experiment may be made at a trifling expence, and, if properly managed, will afford no small entertainment.

253. *To construct a Box, in which Objects shall be seen through one hole, different from what were seen through another; though in both cases they seem to occupy the whole Box.*

PROVIDE a square box, which, on account of its right angles, is the fittest for this purpose, and divide it into four parts, by partitions, perpendicular to the bottom, crossing each other in the centre. To these partitions apply plane mirrors, and make a hole in each face of the box, to look through; but disposed in such a manner that the eye can see only the mirrors applied to the partitions, and not the bottom of the box. In each right angle of division formed by the partitions, place some object; which, being repeated in the lateral mirrors, may form a regular representation: such as a parterre, or fortification, a citadel, a pavement, divided into compartments, &c. That the inside of the box may be sufficiently lighted, it ought to be covered with a piece of transparent parchment.

It is evident that if the eye be applied to each of the small apertures formed in the sides of the box, it will perceive as many different objects; which, however, will seem to occupy the whole inside of it. The first will be a regular parterre, the second a fortification, the third a pavement, in compartments, and the fourth some other object.

If several persons look at the same time through these holes, and then ask each other what they have seen, a scene highly comic to those acquainted with the secret, may ensue; as each will assert that he saw a different object.

To render the parchment employed for the cover more transparent, it ought to be repeatedly washed in a clear ley, which must be changed each time: it is then to be carefully extended, and exposed to the air, to dry.

If you are desirous of giving it some colour, you may employ, for green, verdigris diluted in vinegar, with the addition of a little dark green; for red, an infusion of brazil wood; for yellow, an infusion of yellow berries. The parchment ought afterwards to be now and then varnished.

254. *An illusory kind of Palingenesy; or to make a Rose appear in a Glass Jar, when held to the Fire.*

BY the following deception credulous people may be easily imposed upon, and induced to believe in the reality of palingenesy.

Provide a double glass jar, of a moderate size; that is to say, a vessel formed of two jars, placed one within the other, in such a manner that an interval of only a line in diameter may be left between them. The vessel may be covered with an opaque top, or lid, so disposed that by turning it in different directions, the inner jar may be raised from, or brought nearer to, the bottom of the exterior one. In the interior jar, on a base representing a heap of ashes, place the stem of an artificial rose. Into the lower part of the interval between the two jars, introduce a certain quantity of ashes, or some solid substance of a similar appearance, and let the remainder be filled with a composition made of one part of white wax, twelve parts of hog's lard, and one or two of clarified linseed oil. This oily compound, when cold, will entirely conceal the inside of the jar; but when brought near the fire, if done with dexterity, it will dissolve; and, by shaking the lid, under a pretence of hastening the operation, the compound may be made to fall down into the bottom of the exterior jar. The rose in the interior one will then be seen, and the credulous spectators, who must not be suffered to approach too near, will be surprised and astonished. When you wish to make the rose disappear, remove the jar from the fire, and, by a new slight of hand, make the dissolved semi-transparent wax flow back into the interval between the jars. By accompanying this manœuvre with proper words, the spectators will be more easily deceived, and will retire firmly persuaded that they have seen one of the most curious phenomena that can be exhibited, by the united efforts of chemistry and philosophy.

255. *To shew a curious and very pleasant appearance with a Polyscope, or Multiplying Glass.*

POLYSCOPE, in optics, is a multiplying glass, or lens, consisting of several plane surfaces, disposed into a convex form. Thus may the images of objects be multiplied in a camera obscura, by placing a polyscope at its aperture, and adding a convex lens at a due distance therefrom, and it really makes a very pleasant appearance, if a prism be applied, so as the coloured rays of the sun, refracted therefrom, be received on the polyscope; for by this means they will be thrown on a paper, or wall, near at hand, in little lucid specks, much exceeding the brightness of any precious stone, and in the focus of the polyscope, where the rays decussate, (for in this experiment they are received on the convex side) will be a star of surprizing lustre.

If images be painted in water colours, in the little squares of a polyscope, and the glass applied to the aperture of a camera obscura, the sun's rays passing through it will carry with them the images thereof, and project them on the opposite wall. This artifice bears a resemblance to that other, whereby an image on paper is projected on the camera, viz. by wetting the paper with oil, and straining it tight on a frame; then applying it to the aperture of the camera obscura, so as the rays of a candle may pass through it upon the polyscope.

256. *To make an Anamorphosis, or deformed Image, which shall appear regular and beautiful through a Polyscope, or Multiplying Glass.*

AT one end of a horizontal table, erect another perpendicularly, upon which a figure may be designed; and on the other end erect another to serve as a fulcrum, or support, moveable on the horizontal one.

To the fulcrum apply a plano convex polyscope, consisting, for example, of twenty-four plane triangles, and let the polyscope be fitted in a draw tube, of which that end towards the eye may have only a very small aperture; and a little farther off than the focus remove the fulcrum from the other perpendicular table, till it be out of the distance of the focus, and the more so as the image is to be greater. Before the little aperture place a lamp, and trace the luminous areolæ, projected from the sides of the polyscope, with a black lead pencil, on the vertical plane, or a paper applied upon it. In the several areolæ design the different parts of an image, in such a manner as that, when joined together, they may make one whole, looking every now and then through the tube, to guide and correct the colours, and to see that the several parts match and fit well together. As to the intermediate space it may be filled up with any figures or designs at pleasure, contriving it so as that, to the naked eye, the whole may exhibit some appearance very different from that intended to appear through the polyscope.

The eye now looking through the small aperture of the tube, will see the several parts and members dispersed among the areolæ, to exhibit one continued image; all the intermediate parts disappearing.

257. *To form a Picture which, when seen in front, and on the two sides, shall exhibit three different Subjects.*

FOR this purpose the picture of the ground must be cut into bands, and cemented to that ground in such a manner, that a space shall be left between them, equal to the thickness of a very fine card. On these intervals, raise, in a direction perpendicular to the ground, bands of the same card, nearly equal in height to the interval between them: and on the right faces of these pieces of card, cement the parts of a second painting, cut also into bands. In the last place, cement the parts of a third picture, cut in the same manner, on the left faces of the pieces of card. It is evident that when this picture is viewed in front, at a certain distance, the bottom painting only will be seen; but if you stand on one side, in such a manner that the height of the slips of card conceals from you the bottom, you will see only the picture cemented, in detached portions, to the faces turned towards that side: if you move to the other side a third painting will be seen.

258. *A method of drawing a deformed Figure, which will appear well-proportioned, from a certain point of view.*

DRAW any thing you may fancy on a piece of thin white pasteboard; then prick it in holes along the outline of the figure thus drawn. Afterwards place the same, in a perpendicular position, on an horizontal surface, which we will suppose to be another pasteboard. Put a lighted candle behind that drawing, and draw, on the horizontal surface, the lines given by the light: this will give a deformed design. This being done, take away the drawing that was pricked, and the candle; then place your eye in the point where the light was situated, and you will see your drawing assume the regular form of the first design.

259. *To cut Glass without the help of a Diamond, in the same Shape as the mark of the Drawing made on it with Ink.*

THIS remarkable operation unites utility with amusement. For being in the country, or in a place where there is no glazier, or glassman, the following means will answer the purpose without their assistance.

Take a bit of a walnut tree, about the thickness of a candle, and cut one of its ends to a point; put that end in the fire, and let it burn till it is quite red. While the stick is burning, draw on the glass, with ink, the design, or outline of the form, in which you mean to cut it out. Then take a file, or a bit of glass, and scratch a little the place where you mean to begin your section. Then take the wood, red hot, from the fire, and lay the point of it about the twentieth part of an inch, or thickness of a guinea, from the marked place, taking care to blow always on that point, in order to keep it red. Follow the drawing, traced on the glass, leaving the same interval as finished, under a window, towards the sun, so that the flat side be towards it; and if there be any more windows in the apartment, let them be shut up. As soon as the beams of the sun shine through these trigonal glasses, your apartment will appear like a paradise in the greatest beauty, and of various colours. If you receive the beams, on a concave glass, you will see the colours change quite different from what they were before; and if you look through these glasses, into the street, you will see every thing in different colours.

263. *To ornament a Room with a continually moving Picture.*

PLACE a large picture against a wainscot, in a summer-house, or any other room where the wind may be conveyed to the back of the picture; bore little holes through the wainscot, to correspond with some pasteboard wheels that are at the back of the picture; the wind which blows on them, through the little holes, will put them in motion. Having, on the right side of the picture, subjects painted and fixed to the pasteboard wheels on spindles, they will have an equal motion with them. There may be several things represented in the picture, and their motions made to correspond; as for example—A man grinding knives, a woman at her spinning wheel, a wind or water mill, and several [illegible]her fancies.

264. *Method of making the Tree of Saturn.*

DISSOLVE an ounce of sugar of lead in a quart of clear water, and put it into a glass decanter or globe; then suspend in the solution, near the top, a small piece of zinc of an irregular shape. Let it stand undisturbed for a day, and it will begin to shoot out into leaves, and apparently to vegetate. If left undisturbed for a few days, it will become extremely beautiful, but it must be moved with great caution.

It may appear to those unacquainted with chemistry, that the piece of zinc actually puts out leaves, but this is a mistake, for if the zinc be examined it will be found nearly unaltered. This phenomenon is owing to the zinc having a greater attraction for oxygen than the lead has, consequently it takes it from the oxyde of lead, which re-appears in its metallic state.

265. *To make two pleasing Experiments with a Concave Mirror.*

IF a fire be made in a large room, and a smooth well polished mahogany table be placed at a good distance near the wall before a large concave mirror, so that the light of the fire may be reflected from the mirror to its focus on the table, if you stand by the table you will see nothing but a long beam of light, but if you stand at some distance as towards the fire, you will see on the table an image of the fire large and erect; and if another person, who knows nothing of the matter beforehand, should chance to enter the room, he will be startled at the appearance, for the table will seem to be on fire, and being near the wainscot, to endanger the whole house. For the better deception, there ought to be no light in the room but what proceeds from the fire.

If the fire be darkened by a screen, and a large candle be placed at the back of the screen, then a person standing by the candle will see the appearance of a fine large star or rather planet on the table, as large as Jupiter or Venus; and if a small wax taper be placed near the candle, it will appear as a satellite to the planet, if the taper be moved round the candle, the satellite will be seen to go round the planet.

266. *To produce two or three curious and entertaining effects with a Cylindrical Mirror.*

A concave cylindrical mirror, which is a glass ground by the revolution of a cylindrical tool turning on its axis, produces two or three curious and entertaining effects. The face, presented to one mounted in a square frame, will appear in one direction elongated, or in a vertical direction deformed in an extraordinary manner. If the mirror be turned a quarter round, the face will be extended in a similar way, but horizontally. A finger placed to the right side of the nose while the face is within the focus of the mirror, will appear as in a plain mirror, but if the face and finger together be carried backwards in the axis of the glass beyond the focus, the finger will, in a singular manner, appear on the left side, though every other part of the face appears unaltered.

The cause is, the mirror's having only a longitudinal focus in one direction, viz. the cylindrical direction of its curve.

267. *By the means of two Looking Glasses to make a Face appear under different forms.*

HAVING placed one of the two glasses horizontally, raise the other to about right angles over the first, and while the two glasses continue in this position, if you approach the perpendicular glass, you will see your face quite deformed and imperfect, for it will appear without forehead, eyes, nose, or ears, and nothing will be seen but a mouth and a chin, raised bold. Do but incline the glass ever so little from the perpendicular, and your face will appear with all its parts, except the eyes and the forehead. Stoop it a little more, and you will see two noses and four eyes; and then a little further, and you will see three noses and six eyes. Continue to incline it still a little more, and you will see nothing but two noses, two mouths, and two chins; and then a little further again, and you will see one nose, and one month; at last incline a little further, that is, till the angle of inclination comes to be forty four degrees, and your face will quite disappear.

If you incline the two glasses the one towards the other, you will see your face perfect and entire, and by the different inclinations, you will see the representation of your face, upright and inverted alternately, &c.

268. *To make a red Liquor, which when poured into different Glasses, shall become Yellow, Blue, Black, or Purple.*

THIS phenomenon may be produced by the following process. Infuse a few shavings of logwood, in common water, and when the liquor is sufficiently red, pour it into a bottle: then take three drinking glasses, and rinse one of them with strong vinegar; throw into the second a small quantity of pounded alum, which will not be observed if the glass has been newly washed, and leave the third without any preparation. If the red liquor, in the bottle, be poured into the first glass, it will assume a straw colour, somewhat similar to that of Madeira wine; if into the second, it will pass gradually from bluish grey, to black, provided it be stirred with a bit of iron, such as a key, for example, which has been privately immersed in good vinegar. In the third glass, the red liquor will assume a violet tint.

269. *Method of Engraving in Relief on the Shell of a new laid Egg, a coat of Arms, Mosaic Piece, Medallion, or any other Design.*

CHUSE an egg that has a thick shell, wash it well in fresh water, then dry it very carefully with a linen cloth, this being done, put some tallow or fat in a silver spoon, then hold it on the fire; when the fat is melted and very hot, it will serve instead of ink, for drawing with a new pen, whatever you please. This being finished, you are to take the egg by the two ends, between two fingers, and then lay it gently in a tumbler, filled with good white wine vinegar, wherein after remaining for three hours and an half, the acid of the vinegar will have eaten enough of the thickness of the shell, and as it cannot have the same effect on those places that are covered with the fat, all the drawing will have preserved its thickness, and will form the relief that is wanted, the operation sought for.

By this means one may draw on an egg, a coat of arms, a mosaic piece, medallion, or any other design whatever.

270. *Curious manner of making Eggs larger than that of an Ostrich.*

PART the yolks from the whites of a number of common eggs, and strain them into two different pans or basons according to the size and quantity wanted. To make a large egg, take a bladder and fill in as much yolk as will be when tied up round like a ball, and boiled of the magnitude wanted, and having boiled it hard, put it into another bladder surrounded with sufficient white, tie it up in an oval form, and boil that also hard. A very large egg thus prepared, has a very fine effect with a grand sallad, and in ragouts, &c. one large yolk alone, which may easily be made, looks extremely pleasing.

271. *To make a Deaf Man hear the sound of a Musical Instrument.*

IT must be a stringed instrument, with a neck of some length, as a lute, a guitar, or the like, and before you begin to play, you must by signs, direct the deaf man to take hold with his teeth, of the end of the neck of the instrument, for then if one strikes the strings with the bow one after another, the sound will enter the deaf man's mouth, and be conveyed to the organ of hearing through the hole in the palate, and thus the deaf man will hear with a great deal of pleasure the sound of the instrument, as has been several times experienced ; nay, those who are not deaf may make the experiment upon themselves, by stopping their ears so as not to hear the instrument, and then holding the end of the instrument in their teeth, while another touches the strings.

Another Way.

The following was inserted in the Courier, of Tuesday July 10, 1804,

A correspondent who has the misfortune to be deaf, has communicated the following simple expedient, for still enjoying the pleasures of music, under the pressure of that calamity.

In my early days I was a great admirer of music; but having lost my hearing many years ago, I likewise lost those delightful charms, which not only please the ear, bt give delight to the heart, even in its saddest moments. Having some old instruments by me, and my children springing up, I was desirous they should learn, but not being able to know when they were right or wrong, it put me upon the trial of many methods. The best I have yet found, is by placing a straight small lath, any convenient length, one end against the instrument played upon, the other against the upper teeth, (the under teeth have no effect) or against the nerve close behind the ear. Persons deaf will be agreeably surprised to find they can distinguish every note as distinctly as when they had their perfect hearing. It must be observed, that only stringed instruments are here meant.

272. *To observe an Eclipse of the Sun.*

A good telescope must be provided, of at least three or four feet in length, which must be directed towards the sun, on a convenient supporter; If you are then desirous to look at the sun with the telescope, you must employ a piece of smoked glass, or rather two pieces, the smoked sides of which are turned towards each other, but are prevented from coming into contact by means of a small diaphragm, cut from a card placed between them.

These two bits of glass may be then cemented at the edges, so as to make them adhere. By means of these glasses, interposed between the eye and the telescope, you may then view the sun without any danger to the sight.

But if, instead of observing in this manner, you are desirous to make an observation susceptible of being seen by a great number of persons at the same time, affix to your telescope, on the side of the eye-glass, an apparatus to support a piece of very straight pasteboard, at the distance of some feet. This pasteboard ought to be perpendicular to the axis of the telescope, and if it be not sufficiently white, you must paste to it a sheet of white paper. Make the end of the telescope, which contains the object glass, to pass through the window shutter of a darkened room, or one rendered considerably obscure; and if the axis of the telescope be directed to the sun, the image of that luminary will be painted on the paper, and of a large size, according as the paper is at a greater distance.

273. *To make a Liquor which becomes Coloured and Transparent alternately, when exposed to, or removed from the contact of external Air.*

DIGEST copper, that is to say, dissolve it slowly by means of a gentle heat, in a strong solution of volatile alkali: as the solvent attacks the copper, it will acquire a beautiful blue colour. If you pour some of this liquor into a small bottle till it is nearly full, and then close it well with a stopper, the colour will gradually become fainter, and at last disappear. On opening the bottle, the colour will return, and this alternation may be produced as often as you please.

274. *How to improve the View of Prints in a Diagonal Mirror.*

IF an assemblage of shell-work environ the view, between the print and the mirror, the picture will have a beautiful frame to it.

The mirror is placed in a diagonal mirror, at an angle of 45 degrees, or the line running between the opposite corners of a square.

275. *To shew a curious Experiment with a piece of New Bread.*

MOULD a piece of new bread, of about an inch square, into a figure with six taper points, which acquires so surprizing a degree of elasticity in the working, that it will not stick, break, or in the least alter its figure, though it be thrown by all the company successively, with their whole strength, against the wall, the floor, and even a marble hearth.

276. *To make a curious Hydrostatical Lamp.*

THE hydrostatical lamp consists of a small circular piece of common writing paper, about three-eighths of an inch in diameter, having about a quarter of an inch of soft cotton thread standing up through a puncture in the middle, by way of a wick.

This being placed on the surface of pure salad oil, contained in a bason or flat glass vessel, is no sooner lighted than it immediately sails forward in some direction, till it meets the side of the vessel, and afterwards takes a circular course, always bearing up towards the sides of the vessel, and thus performs a number of revolutions.

It has been long known, that bits of camphor, and some other substances being placed on water, appear agitated in an extraordinary manner.

277. *To make a Phosphoric Firework.*

PUT a piece of phosphorus, about the size of a large bean, into a clean Florence flask, and pour upon it about six ounces of water: place the whole over a lamp, and light the wick, which should be about half an inch from the flask: as soon as the water is heated, streams of fire will issue from it by starts, resembling sky rockets; some particles will adhere to the sides of the flask, and represent stars, and will frequently display brilliant rays. These appearances will continue at times, till the water begins to simmer, when immediately a curious aurora borealis begins, and gradually ascends, till it collects into a pointed flame, when this has continued about half a minute, blow out the flame of the lamp, and the apex of the flame will rush down, forming beautiful illuminated clouds of fire, rolling over each other for some time, which disappearing, a splendid hemisphere of stars presents itself; after waiting a minute or two, light the lamp again, and nearly the same phænomena will be displayed as from the beginning. Let a repetition of lighting and blowing out the lamp be made three or four times at least, that the stars may be increased; after the third or fourth time of blowing out the lamp, and in a few minutes after the internal surface of the flask is dry, many of the stars will shoot with great splendour, from side to side, and some of them with brilliant rays, and these appearances will continue several minutes.

278. *A Piece of Money being put into a Glass, how to make Two Pieces appear, one of which shall be much larger than the other.*

TAKE a large drinking glass, of a conical figure, that is, small at bottom and wide at top, in which put a shilling, and fill the glass about half full with water: then place a plate on the top of it, and turn it quickly over, that the water may not get out. You will then see, on the plate, a piece of the size of a half crown; and somewhat higher up, another piece of the size of a shilling.

279. *To make a piece of Gold or Silver disappear, without altering the position of the Eye or the Piece, or the intervention of any thing.*

PUT the piece of gold or silver into a porringer full of water, or a vessel that is broader than it is deep, and let the eye be in such a position as just barely to see the piece at the bottom, over the brim of the vessel: then take out the water, and though the porringer continues in the same position, as well as the eye, the piece which appeared before, by virtue of the refraction made in the water, will then be covered from the sight by the sides of the porringer.

280. *To fill a Glass with Water in such a manner, that a Person shall not be able to remove it without spilling it all.*

LAY a bet with any one that you will fill a glass with water, and place it on a table in such a manner, that it cannot be removed without spilling the whole water it contains. Then fill a glass with water, and placing over it a bit of paper, so as to cover the water and the edge of the glass, clap the palm of your hand on the paper, and laying hold of the glass with the other, suddenly invert it on a very smooth table. If you then gently draw out the paper, the water will remain suspended in the glass, and it will not be possible to remove it without spilling the water entirely.

281. *To construct a Vessel from which Water shall escape through the Bottom, as soon as its Mouth is unstopped.*

AMONG the number of the amusing tricks founded on philosophical principles, we may class the following. Provide a vessel of tin plate two or three inches in diameter, and five or six inches in height, having a mouth about three lines in width, and in the bottom several small holes of such a size as to admit a small needle. Immerse this vessel in water, with its mouth open, and when full stop it very closely. If you are desirous of playing a trick to any person, give him this vessel, and desire him to unstop it; if he does so, placing it on his knees, the water will escape through the holes in the bottom, so that he will soon be all over wet.

282. *To change the Colour of a Rose.*

TAKE a common full blown red rose, and having thrown a little sulphur finely pounded into a chafing dish with hot coals, expose the rose to the vapour. By this process the rose will become whitish, but if it be afterwards immersed sometime in water, it will resume its former colour.

283. *Method of constructing a Lanthorn which will enable a Person to read by Night at a very great distance.*

MAKE a lanthorn of a cylindric form, or shaped like a small cask, placed lengthwise, so that its axis may be horizontal, and fix in one end of it a parabolic or spheric mirror, so that its focus may fall about the middle of the axis of the cylinder; if a small lamp or taper be placed in this focus, the light passing through the other end will be reflected to a great distance, and will be so bright, that very small letters on a remote object may be read by looking at them with a good telescope. Those who see this light, if they be in the direction of the axis of the lanthorn, will think they see a large fire.

284. *When an Object appears confusedly, by being too near the Eye, to gain a distinct view of it, without changing the place either of the Eye or the Object.*

TAKE a piece of paper, or a very thin card, and make a small hole in it with the point of a needle, and apply that hole close to the eye, making use of it as it were instead of a pupil, and you will be able to see an object distinctly through it, though the object be placed within a short distance of the eye.

285. *An Object being placed behind a Convex Lens, to make it appear before it.*

PROVIDE any object, such, for example, as a small arrow of white wood, an inch and a half in length, and tie it perpendicularly to a piece of black card, which must be suspended from a wall at about the height of the eye. Throw a strong light on the card, and place before it a lenticular glass, two or three inches in diameter, in such a manner that it may be distant from the arrow about twice the length of its focus. If you then make a person stand at a proper distance opposite to the glass, the arrow will appear to him to be suspended in the air before the glass.

286. *To make a colourless Liquor Black, by pouring it into a clean Glass.*

RINSE a clean hot glass in a strong solution of the vitriol of iron, then pour out into a warm infusion of bruised white galls in fair water, made so weak as scarce to afford any colour. This black mixture is instantly made. Instead of galls, you may use red roses, pomegranate bark, or tea, sage, or oak leaves.

287. *Method of Writing in Cyphers with Lattice Work.*

THIS method is both easy and expeditious, nothing is necessary but to provide a piece of paper cut out with square holes in regular order, according to the direction of the lines, and corresponding to those of another piece of paper in the possession of your correspondent. If this paper be laid over another of the same size, write on the latter through the holes whatever you choose, and then, removing the upper paper, fill up the intervals with words forming some kind of sense with those before written on the paper.

288. *How a body of a Combustible nature may be penetrated by Fire, without being consumed.*

PUT into an iron box a piece of charcoal sufficient to fill it entirely, and solder on the lid. If the box be then thrown into the fire it will become red, and it may be even left in it for several hours or days. When opened, after it has cooled, the charcoal will be found entire, though there can be no doubt of its having been penetrated by the matter of the fire; as well as the whole metal of the box which contains it.

289. *A person holding Gold in one hand and Silver in the other, to find which the Gold is in, and which the Silver.*

TRICKS of this kind, though very simple, are really amusing, they are ingenious puzzles to entertain the mind, and as such may be recommended to young people in their seasons of recreation.

That wit or ingenuity which has malice or envy for its object is a spurious offspring, and not the genuine descendant of the sportive god Momus.

Example—Bid him reckon four for the gold, and three for the silver, or any other number so that one be odd and the other even, then let him triple that which is in the right hand, and double that in the left, and let him add these two products together, then ask him if it be even or odd, for if it be even then the gold will be in the right hand, but if odd the gold is in the left hand.

290. *To tell by the dial of a Watch at what Hour any Person intends to rise.*

LET the person set the hand of the dial to any hour he pleases, and tell you what hour that is, and to the number of that hour you add in your mind twelve. Then tell him to count privately the number of that amount upon the dial, beginning with the next hour to that on which he proposes to rise, and counting backwards, first reckoning the number of the hour at which he has placed the hand, an example will make this plain.

Suppose the hour at which he intends to rise be eight, and that he has placed the hand at five, you add twelve to five, and tell him to count seventeen on the dial, first reckoning five, the hour at which the index stands, and counting backwards from the hour at which he intends to rise, and the number seventeen will necessarily end at eight, which shews that to be the hour he chose.

That the hour, at which the counting ends, must be that on which he proposed to rise, will be evident on a little reflection; for if he had began at that hour, and counted twelve, he would necessarily have come to it again, and calling the number seventeen by adding five to it, only serves to disguise the matter, but can make no sort of difference in the counting.

291. *A Person privately fixing on any Number, to tell him that Number.*

AFTER the person has fixed on a number bid him double it, and add four to that sum, then multiply the whole by five, to the product let him add twelve, and multiply the amount by ten; from the sum of the whole let him deduct 320, and tell you the remainder, from which, if you cut off the two last figures, the number that remains will be that fixed on.

292. *To make a Pen which holds one Hundred Sheep, hold double the number, by only adding two Hurdles more.*

IN the first pen, or that which holds one hundred sheep, the hurdles must be so disposed that there shall be only one at the top and bottom, and the rest in equal numbers on each side, then it is obvious that if one hurdle more be placed at each end, the space enclosed must necessarily be double the former, and consequently will hold twice the number of sheep.

293. *To make a mutual Exchange of the Liquor in two Bottles, without using any other Vessel.*

TAKE two bottles which are nearly as equal as possible both in neck and belly, and let one be filled with oil and the other with water, then invert the one that is full of water carefully over the other, so that the two necks shall exactly fit each other, and as the water is heavier than the oil, it will naturally descend into the lower bottle, and make the oil ascend into its place. In order to prevent the water from being spilled in this experiment, it will be advisable to place over the mouth of the bottle a bit of thin writing paper, which, when it is placed in the proper position, should be drawn out quickly and steadily.

294. *To make a piece of Wood of one figure fit exactly and pass through a Circular, a Square, and an Elliptical Hole.*

LET one of the holes be circular, the other square, and the third elliptical, then it is evident that any cylindrical body of a proper size may be made to pass through the first hole perpendicularly, and if its length be just equal to its diameter, it may be passed horizontally through the second or square hole; also if the breadth of the oval hole be equal to the diameter of the base of the cylinder, and its longest diameter to a line drawn from a point in the circumference of the base diagonally, through the center to the opposite side, the cylinder being put in obliquely, will fit it as exactly as any of the former.

295. *To make a Cone or Pyramid move upon a Table, without Springs or any other artificial means.*

FORM a piece of paper, or any other light substance, not transparent, into a conical or pyramidical figure, which must have no bottom, put into it a beetle, or any similar small kind of insect, then, as the animal will naturally endeavour to free itself from its captivity, it will move the figure or body towards the edge of the table, and as soon as it comes there will immediately return, for fear of falling, and by moving backwards and forwards in this manner, will occasion much diversion to spectators who are ignorant of the cause.

296. *How to make a piece of Metal, or any other heavy Body, swim upon the surface of Water, like a Cork.*

THE specific gravity of water is inferior to that of metals, and consequently water, absolutely speaking, cannot support a globe of iron or lead, but if this ball be flattened and beat out to a very thin plate, it will, if put softly upon still water, be prevented from sinking, and will swim upon its surface like any light substance. In like manner, if a fine steel needle, which is perfectly dry, be placed gently upon some still water in a vessel, it will float upon the surface without sinking.

But if you would have a metallic body of large dimensions to swim upon water, you must reduce it into a thin concave plate, like a kettle, in which case, as the air it contains, together with the body itself, weighs less than the same bulk of water, it cannot possibly sink, as is evident from large copper boats or pontons, by which whole armies are frequently passed over rivers without danger.

And if this concave metallic vessel be placed upon the water with its mouth downwards, it will swim as before, and the contained air will keep the bottom of it from being wet, for that the water will not rise into any hollow vessel which is immerged into it, may be made evident thus. Take a glass tumbler and plunge it in water, with its mouth downwards, and you will find when you take it out, that the inside of the vessel is perfectly dry, so that if a live coal had been put there, it would not have been extinguished.

297. *To put a lighted Candle under Water without its going out, or a Handkerchief without its being Wet.*

AS much has been said about the diving bell, this simple trick may serve in some degree to elucidate that contrivance, as it is certainly done on the same principle.

Take a glass, and fastening a small bit of wood across the mouth, stick thereon a bit of candle lighted, and with a steady hand bring the glass to the surface of the water, then push it carefully down, and you may see the candle burn under the water, and may bring it up again unextinguished; and in the same manner you may put a handkerchief, rolled tight together, and it will not be wet.

The principal art in doing this trick consists in the nicety of bringing the mouth of the glass exactly even with the surface of the water, for if you put it the least on one side, the wet will get in, and consequently will put the candle out, or wet the handkerchief, so that a nice eye and steady hand are absolutely necessary for this performance.

298. *To unite Wax and Water, (things absolutely opposite to each other) which forms a good Pomatum, to clean the Skin, and render it soft and white.*

IN order to make this mixture, put in a glazed earthen pot, quite new, six ounces of spring or river water, to two ounces of good white virgin wax, add to this a tea-spoonful of salt of tartar. If you wish to conceal your operation, nothing is easier: make a little roll or stick of wax, in which you may introduce the salt of tartar, put these ingredients on the fire, and when they begin to heat be attentive to stir them with a little stick, and you will see the union take place as soon as the wax melts, you will then have it at your option to render the pomatum, by the result of this operation, more or less liquid by leaving it on the fire a longer or a shorter time.

299. *Method of making a curious Changeable Picture.*

PAINT upon thin paper, in a slight manner, and with very light colours, any subject at pleasure, but disposed in such a manner that, by painting the paper stronger on the other side, it may be entirely disguised. Then cover the last side with a piece of white paper, to conceal the second subject, and inclose the whole in a frame, and even between two pieces of glass.

If you hold this picture between you and the light and look through it, a subject will be seen very different from that which it exhibits when looked at in the usual manner.

300. *To make with a Candle an excellent Light, without any glare, fit for the Weak-sighted to Read by, or those that perform curious and delicate works by Candle-light, as Jewellers, Engravers, &c.*

PROCURE a thin round glass globe, (the larger the better) with a short neck, like a bottle, bind a piece of tape or pack thread about the top or neck of it, so as to make a small loop to hang by, then fill your globe with pure water, (putting some spirits of wine therein, to keep it from freezing) and stop it close, to keep it free from dust; having thus done, when you would use it suspend it between a lighted candle and your book or table, and you will have an excellent light through the globe for your purpose.

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